FEBRUARY, 1956

Traffic Engineering

United Press

Traffic Congestion in Paris, France

- Weighing Trucks in Motion and the Use of Electronic Scales for Research
- Skidding is Our Business
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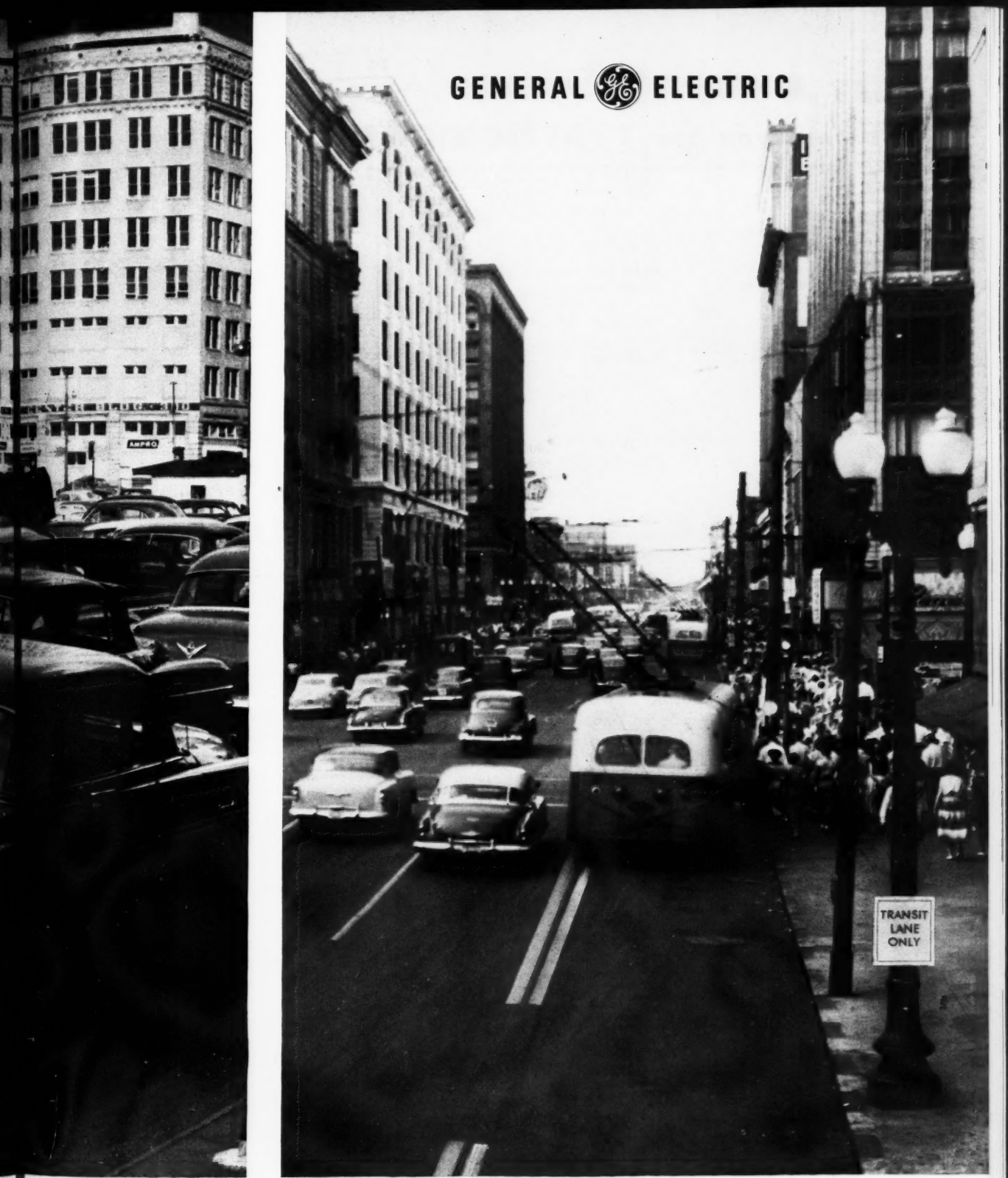

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Traffic Engineering

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COVER: Despite the fact that French-made cars are among the smallest in the world, enough of them can make quite a traffic jam; especially in Concord Square in Paris, where the morning rush hour jam is traditional.

DEFINITION: Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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Frankly Speaking

THERE SEEMS TO BE a growing awareness of the acute deficiencies in the productivity of engineering education. In this dynamic technological age the simultaneous decline in enrollment in engineering colleges represents a serious national problem and a challenge which each engineering specialty must meet competitively with the others.

Traffic Engineering faces as an acute shortage of adequately trained talent as does any profession. A logical development has been growing pleas among the leaders of our profession directed to engineering colleges asking them to solve this problem. Not to suggest that this approach is not of great importance, but to put the responsibility squarely where it belongs at this time, it should be pointed out that the traffic engineer himself must assume a greater share of the responsibility for traffic engineering education if we are to solve the problem.

The place to begin is in your own office with the talent available. Education is a continuing process long after college. Every office should have a readily available reference shelf. Current literature, research reports, technical notebooks, and TRAFFIC ENGINEERING and other magazines should be circulated to all employees at the appropriate level. And, of course, membership in the Institute and participation in Technical Council activities, and the attendance at professional meetings, all foster educational advancement.

The possibility of formalized in-service training programs in the various phases of traffic engineering should not be overlooked. The community is rare that does not have the services available of some university extension or other appropriate agency that can organize a training program. Your own staff can often furnish the instructor.

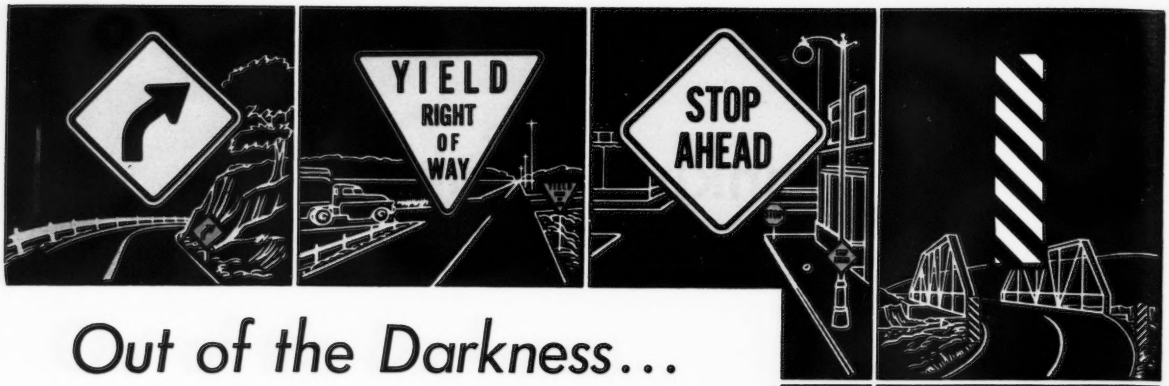
And finally, before we are too free with our criticism of the engineering colleges and universities we should perhaps do more inquiring of them of what they *are* teaching in the highway and traffic fields, and why. Engineering deans welcome the expression of interest through such inquiry and they certainly would welcome any offer of assistance. Consider the possibility of speaking to undergraduate classes or student chapters of professional societies where a "sale" can be made to a prospective traffic engineer. Offer your shop or your traffic projects as subject matter for student field inspections. Place the college technical library in touch with traffic engineering literature or see that such technical traffic engineering reports and publications as are appropriate are placed on the college book shelves. And, invite engineering instructors to attend the appropriate meetings of your professional groups.

These responsibilities, which are yours, if fully assumed will return many dividends over the long pull. Here and there a traffic engineer will be recruited, sub-professional employees will be up-graded, and professional performance will be improved.

Yes, much can be done by traffic engineers themselves, to improve traffic engineering education. Perhaps such steps are prerequistes to any significant advancement in the offering of traffic engineering training in graduate or undergraduate schools.

Jos E Havemner

Vice-President



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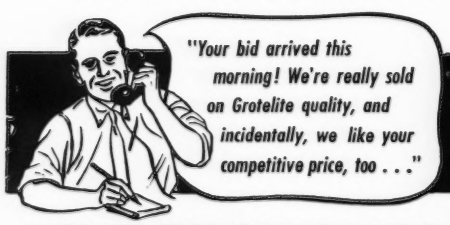
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Weighing Trucks in Motion and the Use of Electronic Scales for Research

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Oregon State Highway Department, Salem, Oregon

This article was prepared for publication in TRAFFIC ENGINEERING MAGAZINE *as well as for presentation at the Annual Meeting of the American Association of State Highway Officials in December and the Annual California Street and Highway Conference in January.*

INTRODUCTION

KNOWLEDGE regarding gross and axle weights of vehicles and the frequency of such loads has long been regarded as a prerequisite to a thorough understanding of the problems of highway design. This knowledge has been obtained in the past through the use of loadometers and the conventional lever-system pit type scales, which by their very nature involve a limited sampling process. The cost of maintaining a crew for weighing and the inconvenience to the trucking industry will usually limit sampling to a bare minimum. To overcome these undesirable aspects of static weighing, the Bureau of Public Roads undertook a study which had as its purpose the development of a scale which would weigh trucks in motion. The results of that study were reported in the April, 1952, issue of *Public Roads* and *Highway Research Board Bulletin No. 50.* The installation in Oregon, described herein, is similar to the unit which was described in those publications.

The Oregon State Highway Department recently purchased two model TR-1 electronic scales manufactured by the Cox and Stevens Aircraft Corporation; however, to record axle weights the Oregon installation uses the Sanborn Recorder, a standard unit which has been adapted for use with the other components of the scale, whereas the Bureau of Public Roads test installation used an oscilloscope. The installation was made on a section of highway which was constructed in 1941. From the time of its construction to November, 1954, this section of roadway experienced very low traffic volumes due to the fact it served only as a connection between US99E and a secondary highway. The 1953 ADT was 350, consisting primarily of passenger cars with a few two and three axle farm trucks. The section on which the electronic scale is located now serves as a connection from the Pacific Highway East *US99E* to the Portland-Salem Freeway *US99* (see Figure 1). The Section *AB* on Figure 1 was intended at the time of the original construction to be a portion of the major highway between Portland and Salem. World War II, however, interrupted the construction of this highway. Following the war, the increased volume of traffic dictated that a four-lane freeway be constructed between Portland and Salem. Because of the large development along the Pacific Highway East *US99E* south of point *B*, it was not feasible to utilize Section *AB* as a part of the Portland-Salem Freeway. Control of access was not acquired on this unit in 1941.

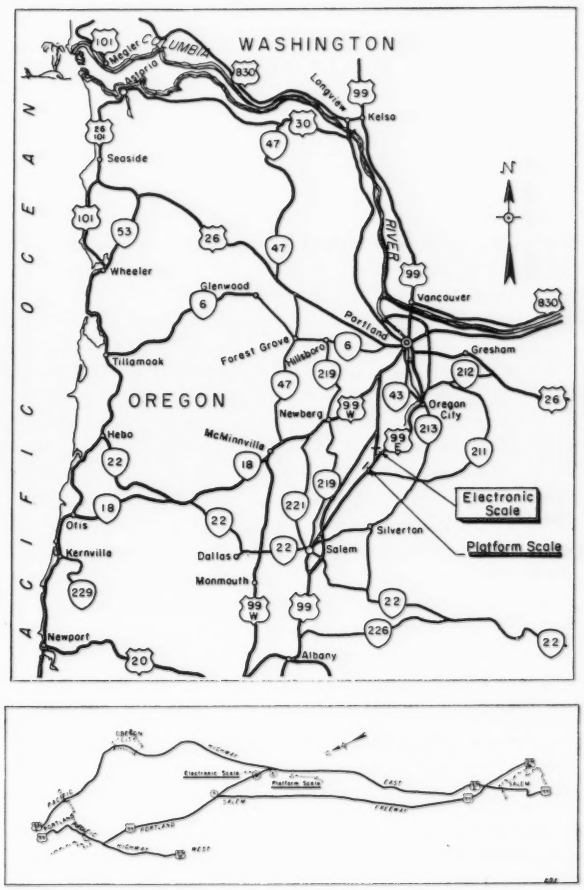


Fig. 1
Vicinity sketch showing location of electronic scale with respect to the highway network.

In November of 1954, the north unit of the Portland-Salem Freeway from the junction with the Pacific Highway West *US99W* to point *A* was opened as a four-lane freeway. Section *AB* then served as a connection to the Pacific Highway East *US99E.* After a year of operation, the traffic volumes on Section *AB* approach 5,000 vehicles per day. This traffic volume consists of 77 percent passenger cars, panels and pickups, and 23 percent trucks, with tractors and semi-trailers and trucks and full trailers comprising 17 percent of the total traffic. On November 1, 1955, the Portland-Salem Freeway partially complete from point *A* south to Salem was opened for the use of vehicles with a gross weight of 10,000 pounds or less. This change will divert the major portion

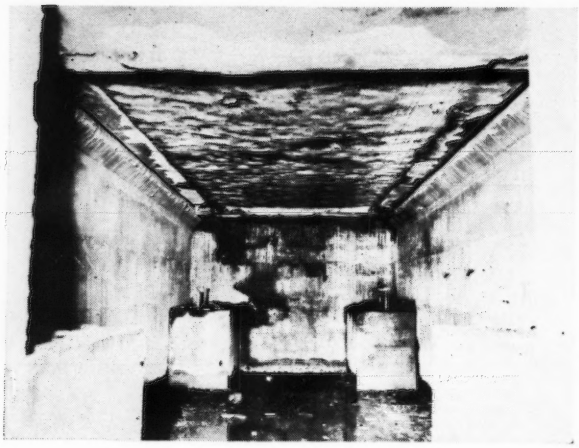


Fig. 2

This is a view of the pit before any equipment was installed. The hold down bolts are clearly visible as well as the bolts for the junction box on the right wall. When this view was taken, the weighing platform was resting on plywood shins on the safety ledges.

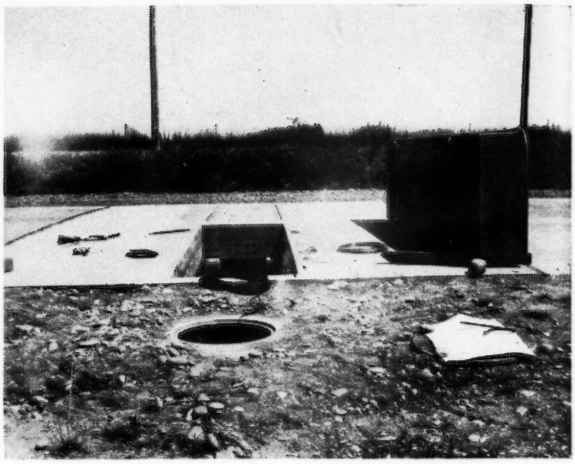


Fig. 3

This is a view of the pit with one weighing platform removed. The power service can be seen on the pole in the left background. This view also shows the manhole which provides access to the pit after the weighing platforms have been installed. The ball adapters have been inserted in the weighing platform and the rubber gasket which seals the pit and tends to control lateral movement of the weighing platform can be seen at the upper right corner of the weighing platform.

of the passenger car traffic from this connection, and it is anticipated that trucks will probably exceed 50 percent of the total traffic on Section *AB* until the final completion of the Portland-Salem Freeway, during the late Summer or early Fall of 1956.

The Oregon State Highway Department, in cooperation with the Bureau of Public Roads, has been conducting long range pavement performance tests to try to determine what effect vehicle weights have upon the pavement performance. The availability of a Portland Cement Concrete pavement placed in 1941 which for 13 years had carried very light traffic volumes and had experienced no noticeable deterioration or breakup, presented a unique section for conducting a pavement peformance test. To obtain complete information on weights, it was decided that electronic scales to weigh vehicles in motion would be used on this test section *AB*. The electronic scales provided a means of gathering data on the weights and frequencies of axles and vehicles, as well as an opportunity to determine the value of the scales for enforcement and research problems.

Pavement Performance Tests

For the study of the performance of the Portland Cement Concrete on this test section six elements of data related to the test section were selected for analysis. These six elements of data and the method by which the data will be obtained are as follows:

1. The design of the slab and the strength of the concrete used in the slab has been obtained from office records and from core samples obtained during the construction of the scale pit.
2. Information regarding the sub-base soil has been obtained from office records and from samples taken during the construction of the scale pit. Additional samples will be obtained at other locations in the event of any noticeable distress in the pavement.
3. Information regarding cracking or pumping of the pavement will be obtained through periodic crack surveys. Cross section elevations have been taken and will be retaken at random intervals during the test period.
4. Construction and maintenance costs are available from office records.
5. Vehicle volumes and classificatons are obtained from a permanent automatic traffic recorder and from manual classification counts.
6. Axle weights and frequencies will be obtained with the use of electronic scale.

Progress of Data Collection

During June, 1953, cross section elevations were taken at 15 ft. intervals on a selected 1,000 ft. section (Station 800 + 92 to Station 810 + 97). Elevations were taken on centerline and six and 12 ft. right and left of centerline at all sections. The expansion joints in the pavement are at 105 ft. intervals, therefore at alternate 45 and 60 ft. intervals elevations were taken 100 ft. right and left of the centerline. Cross section elevations were repeated in July, 1954, and will be taken again when noticeable *break-up* occurs.

Axle weights were measured with loadometers on the section in March, May, August, and November of 1953. Because only negligible variations were observed between these studies, weighing was discontinued in 1954, however, manual classification counts were obtained in February and May of 1954 from which the axle weights can be predicted with a reasonable degree of accuracy.

The installation of the electronic scale was completed in September of 1954. In December of 1954, the first cycle of the comprehensive weighing program to determine a minimum sampling period for the frequency of axle weights was started. This cycle was completed on January 19, 1955, and a second cycle was started on January 24th. The second cycle was completed in March of 1955. Beginning in May, 1955, monthly samples of the frequency of axle weights have been obtained. The data collected for each vehicle weighed, which includes time and direction of travel, individual axle weights, and gross weights, are punched on IBM cards and tabulated for further analysis. It will be possible then to compare pavement performance with equivalent wheel loads, axle weights, or gross weights.

A permanent traffic recorder was installed at the scale site, and has been in operation since December 1, 1953.

During April and May of 1954, the pit for the electronic scale was constructed. At this time core samples were taken

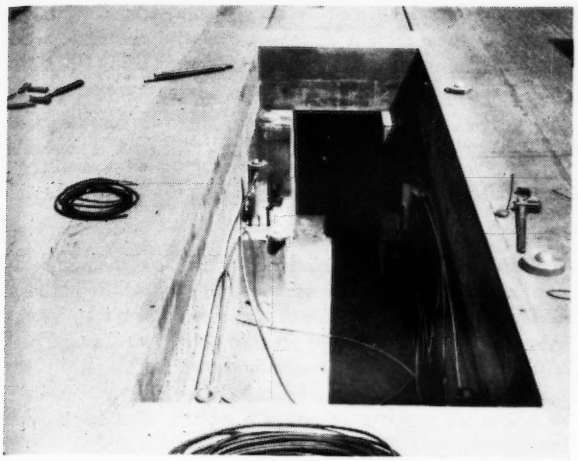


Fig. 4
This view shows the pit practically ready for replacement of the weighing platform. All that remains to be done is insertion of the ball adapters (shown on the edge of the pit) between the columns and the leveling plates. Once a balance has been struck, these adapters will be welded to the leveling plate. In this view the junction box is open. It will not be closed until the weighing platform is balanced and the scale is operating satisfactorily.

of the Portland Cement Concrete and soil samples were taken from the sub-base. The Portland Cement Concrete pavement is nine inches thick at the outside edge, tapering to seven inches in three feet, and continuing seven inches in thickness to the centerline, placed on four inches of pitrun gravel. The laboratory tests of the concrete indicated an average strength after 14 years of 4,620 psi, the average 28 day strength obtained during construction in 1941 was 3,460 psi The soil taken from the grade was found to be silty clay (P R A Type A 4 (8)).

Crack surveys were made in November, 1954, and April, June, September, and October, 1955. The initial signs of cracking were noted during the September, 1955, survey with additional cracks noticed in the October Survey. No evidence of pumping has been found through October, 1955.

Electronic Scale

To obtain complete information on axle weights, it was necessary to install two separate scales so that both directions of traffic could be weighed at normal operating speeds. The first scale was installed in June, 1954, and the second in September, 1954. Both scales, Model TR-1 were purchased from Cox and Stevens Aircraft Corporation at a cost of $3,900 for the first scale and $3,750 for the second scale. The cost for the construction of the scale pit and the frame building housing the recording equipment was approximately $2,850, and the cost of the calibration and installation of the scale was approximately $1,500. The total cost for the two scales installed in Oregon was approximately $12,000.

The electronic scale consists of a narrow weighing platform built into the surface of the traffic lanes and supported by load cells containing columns to which are fixed groups of wire strain gauges. The weight applied to the weighing platform by a vehicle passing over it produces changes in the electrical current flowing through the strain gauges which are reproduced through electronic equipment on a moving tape to represent the axle weight. While the theory of the device is relatively simple, the operation at this state of its development is somewhat complicated.

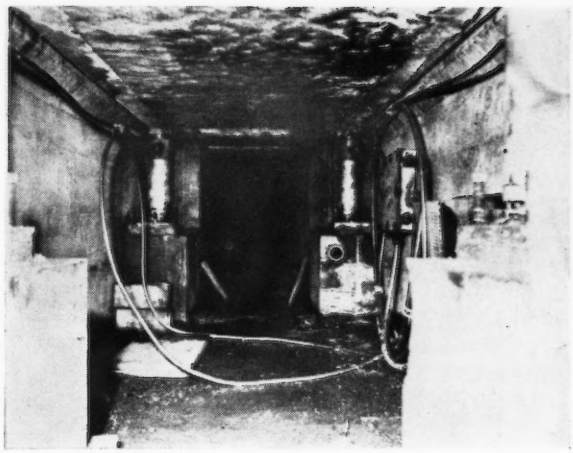


Fig. 5
This is a view of the pit after the southbound installation was completed. The grout can be seen between the ledge and the leveling plate. The junction box is closed and sealed with mastic.

Installation of Scale

The reinforced concrete scale pit was constructed so that the floor was approximately four feet below the roadway, leaving slightly over 2½ ft. of working space when the weighing platform is in place (see Figures 2, 3, 4, and 5). This allows sufficient room for two men to work in the pit with reasonable comfort. The pit is drained into a sump at one end to eliminate any free water in the pit. Access to the pit is provided through a manhole located in the shoulder of the roadway. Conduit was provided for electrical leads to the scale house which is located near the edge of the right of way. The leads from each scale to the recording instruments were carried in separate conduits. The four columns rest on individual leveling plates which are supported by four leveling screws. Each column is fitted with ball sockets top and bottom to eliminate bending moment introduced by lateral movement of the slab.

The weighing platform for each scale is 36 inches by 10 ft. 6 inches in plan, and 15 inches deep. It is constructed of reinforced concrete poured inside a frame formed by a 15 inch and 34 pound per foot channel. Lifting loops are provided in the top to facilitate handling. The total weight of the weighing platform is slightly more than 7,000 pounds.

Rubber road tubing was placed on the pavement at a predetermined distance on both sides of the weighing platform. These road tubes are connected to air switches in the pit and serve as a starting and stopping switch for the recording equipment. In addition, this automatic starting and stopping provides a means of determining from the recording tape the speed at which the vehicle was traveling.

The Bureau of Public Roads research has shown the importance of having the weight of the platform equally distributed over the four supports. This was the most difficult part of the installation. Variations of 1/1000 of an inch in the height of a column produce large changes in the load on the remaining three. Adjustments were made to the leveling screws until the recorded weights on the four columns were within a range of 500 pounds. This adjustment was accomplished by connecting one cell at a time to the recording instrument and measuring the weight supported by that cell. This is the most time consuming and painstaking work involved in the installation. During the adjustments it was

Fig. 6
This is a view of the tractor and semi-trailer which was used to calibrate the scales. This view also illustrates the weighing platform which would not be particularly noticeable to an approaching motor vehicle operator.

necessary to check frequently the elevation of the platform with relation to the adjacent roadway surface.

When equal readings on each column were obtained and the platform had been checked to assure a smooth roadway surface, the area between the leveling plate and the ledge on which it rests was packed with grout. Following this, no further adjustments could be made except with the use of shim stock. Once the structure had been balanced, the four cells were connected through a junction box located in the pit to the recording instrument. During the installation, the leads from the columns were cut to a uniform length, and run through copper tubing to the end of the conduit. All joints were sealed to minimize the effect of moisture.

Following this, the recorder was adjusted and a loaded tractor with semi-trailer was brought to the site (see Figure 6). The unit had been weighed on a pit scales located approximately one mile south of the new installation, and had a front axle weight of 7,000 pounds, a drive axle weight of 21,000 pounds, and two trailer axle weights of 16,000 pounds each. The scale was then adjusted to read accurately at these weights for the static load. Following this, the truck made several runs at speeds of 10, 20, 30, 40, and 50 MPH in each direction. The recorder tapes were then taken to the office for analysis.

Arrangements were made later with a large freight line to operate their regular schedules over the electronic scale. These trucks, in addition to the few already using the highway, gave a sizeable sample. Static weights were obtained by loadometers and the pit scale south of the electronic scale. From this and a number of subsequent tests, the accuracy of the scale was determined. Correction factors were then computed, and a comprehensive weighing program was begun.

Axle Weights

Axle weights are determined by reading them directly from the recorder tape, a typical section of which is shown in Figure 7. This figure shows the pattern resulting from a five axle tractor and semi-trailer combination. Comparisons with static weights have repeatedly shown that the low point, the lowest point where the curve departs from a nearly vertical line, gives the most accurate weight. This is probably attributable to a combination of overshooting of the stylus due to inertia of the stylus itself, and impact on the weighing platform.

The scale shown on the left of the tape is only approximate. The recorder is not linear, although it is nearly so, and the actual calibration changes slightly due to instrument drift when the instrument is in operation. Because this change is gradual, it can be compensated for by making calibration checks at periodic intervals. Introducing electrical loads by use of the load switch permits calibration without the necessity of applying known weights to the platform. In practice this is done by introducing electrical loads in 5,000 pound increments while the tape is moving.

Even a cursory examination of Figure 6 reveals that the weights are obtainable only to the nearest 1,000 pounds. There would appear to be no merit in attempting to read the weights to smaller units. The recorder gain can be adjusted to give more height to the weight curves, but the width of the tape governs the amount of this adjustment, and the weight of the line drops off rapidly with increased stylus travel, so this has never been deemed advisable.

In the initial tests, the differences in weights of tandem axles were a cause of considerable concern. Variations of as much as 8,000 pounds between individual axles of a tandem pair have been observed. Because of the suspension devices used by truck manufacturers, it would seem that the combined weight of the tandem pair would be distributed equally between the two axles. This apparently is not the case

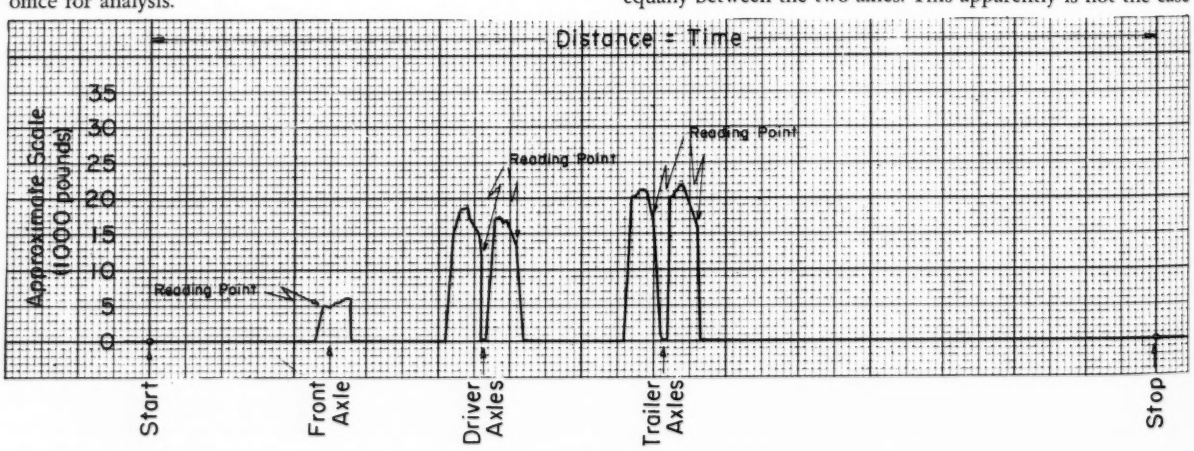


Fig. 7
A typical section of the tape showing the recorded pattern of a five axle tractor and semi-trailer combination. The scale on the left is only approximate, in practice the recorder is not truly linear. Note that the lowest point where the curve departs from a tangent slope yields the most accurate weight. This may occur on either side of the curve.

when the vehicle is in motion, apparently due to the variation in the lines of force within the dual axle assembly. Either one of the pair may be the heavier and equal distribution is an infrequent occurrence. The combined weight of tandem pairs as recorded by the electronic scale agrees closely with the combined weight recorded by pit scales or loadometers. This subject is discussed in more detail under the sub-heading of accuracy.

Accuracy

The data obtained from the tests wherein trucks were weighed on both the electronic and pit scales or loadometers were analyzed to determine the accuracy of the weights recorded by the electronic scales. In this analysis, the static weights from the conventional lever-system pit scales which are sealed to a tolerance of two-tenths of one percent, were assumed to be the true weights. It is the accepted practice at static scales to weigh tandem pairs as one unit and divide this weight by two to give the single axle weights. In the case of the electronic scale, the weight of each individual axle is recorded whether it is part of a tandem pair or a single axle. As was mentioned earlier, there is a considerable discrepancy between the individual weights recorded by the electronic scale and the weight which would be credited to a tandem axle by the method employed at static scales. For this reason, several analyses were made, one of which used all axles and included the electronic scale recorded weight of the individual axles of tandem pairs. Another analysis used the average of the two weights for the axles of tandems. A separate analysis was run on single axles only, and separate analyses were made of tandem pairs, one of which treated with the recorded weights of tandem axles, and the other with the average weights of the pair. The best coefficient of correlation was obtained for that analysis which compared all axles and included the average of tandem pairs. This coefficient of correlation was 0.96 for both the northbound and southbound scales. The standard error of estimate under this condition was 1,370 pounds for the northbound scale and 1,210 pounds for the southbound scale.

A separate analysis of the gross weights of the vehicles showed a coefficient of correlation of 0.99 when the gross electronic weight was compared with the gross static weight. The standard error of estimate for this case was 2,700 pounds for the northbound scale and 3,600 pounds for the southbound scale. These results are shown in Table I.

When the equations for the best fitting straight lines were computed it was found that it would be necessary to add 1,000 pounds to recorded weights in excess of 4,000 pounds on the northbound scale, and subtract 1,000 pounds from the recorded weight of all axles on the southbound scales. Subsequently, these corrections were made to all weights obtained by the scales.

The degree of accuracy reflected by the figures in Table I is sufficient for research purposes, it would not be sufficient for law enforcement purposes of the imposition of fines for overweights. It is believed that some system could be developed whereby an electronic scale would screen those trucks which appear to be overloaded in advance of an established lever-system pit scale, thereby eliminating the necessity of weighing all trucks in the traffic stream and reducing delays to properly loaded truck operators for weight enforcement.

Speed

Speed measurements are theoretically possible from the tape if they are desirable. The recorder tape moves at a constant speed approximately five centimeters per second, and the distance between the *start* and *stop* road tubes is fixed. The length of time required by the vehicle to traverse the distance between the two tubes can be measured on the tape, and this time converted into vehicle speed. Once the speed is known, the axle spacing could also be determined. These calculations are straight-forward applications of simple arithmetic; however, the accuracy of them is dependent on several factors, the first of which is the reliability of the mechanism which starts and stops the tape. Constant time lags between vehicle actuations and the actual starting and stopping of the recorder tape could be compensated for, but variable time lags would materially affect the accuracy of the speed calculations. The second factor of importance is the speed of the tape. This speed would have to be constant if accurate time dimensions were to be obtained.

TABLE I

ELECTRONIC SCALE ACCURACY

Moving Weight vs. Static Weight

	NORTHBOUND		SOUTHBOUND	
Weight Groups	r [1] Coefficient of Correlation	S_r [2] Standard Error (Pounds)	r [1] Coefficient of Correlation	S_r [2] Standard Error (Pounds)
All Axles[3]	0.95	1500	0.96	1220
All Axles[4]	0.96	1370	0.96	1210
Single Axles only	0.96	1250	0.98	980
Axles of Tandem Pairs only (As measured by Electronic Scale)	0.83	2070	0.92	1260
Axles of Tandem Pairs only (Averaged by Pairs)	0.90	1330	0.94	1070
Gross Weight[5]	0.99	2700	0.99	3600

1 The coefficient of correlation (r) is a measure of the interdependence of two variables. Increasing values of r reflect increasing degrees of relationship from no relationship where $r = 0$ to complete interdependence, when $r = \pm 1.00$. A positive r value indicates both variables tend to increase (or decrease) together, whereas a negative value indicates that one variable increases as the other decreases.

2 A standard error (S_r) is a measure of the maximum range of the error that can be expected when the value of one unknown variable is predicted from the value of a known variable. The predicted value will vary from the true value by not more than a standard error for 68 percent of the estimates. The error is expressed in the same units as the unknown variable.

3 Includes each axle of tandem pairs as measured by the electronic scale.

4 Includes average weights for each axle of tandem pairs.

5 All units.

Inasmuch as speed and axle spacings were of only minor interest in the study, no concentrated effort was put forth to obtain accurate data from the instrument. It may well be that accurate speeds and axle spacing could be obtained from the recorder, but such speed checks as were made against calibrated speedometers and a radar speed meter showed the speeds obtained from the electronic scale to vary remarkably from the true speed of the vehicles. Accurate speed and axle spacings would probably require some adjustments to or modification in the apparatus.

(Continued on page 206)

Skidding Is Our Business

by Stanley T. Siegel (Assoc. Mem., ITE)
Secretary, Committee of Winter Driving Hazards
National Safety Council, Chicago, Illinois

Fig. 1
Public education is an important part of the activities of the Committee on Winter Driving Hazards, and the "Skid Tests" provide an excellent background for movie production. In this picture, Jim Goyette and Danny Maselli are shooting a scene to be included in the 13-minute sound film "Don't Skid Yourself" produced by the Aetna Life Affiliated Companies in cooperation with the Committee. In the foreground, Red Daniels, one of the ace test drivers participating in the tests, adjusts the trailing fifth wheel on one of the test vehicles.
than 200 feet in diameter. The wide ice strip, about 100 feet wide and

IT'S QUITE A THRILL to drive along at 20mph, press down on your accelerator until your wheels and car are both spinning, and then jam on your brakes and hold them until your car slides to a gentle stop—without fear of damaging yourself or your vehicle.

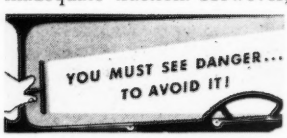
This kind of driving is not considered good driving practice except at the "Skid Tests." Such seemingly foolhardy maneuvers, combined with many considerably less spectacular activities and conducted under carefully controlled conditions, have enabled the skilled test drivers, engineers and technicians of the National Safety Council's Committee on Winter Driving Hazards to obtain much valuable information regarding the problems of driving under the extreme conditions of wintertime.

The purpose of this article is to explain the activities of the Committee on Winter Driving Hazards and to describe some of the testing procedures and techniques. The Committee is planning extensive evaluation of past accomplishments and future activities, beginning with a Winter Study Evaluation Workshop in February, 1956. Since it is likely that a report of the total accomplishments of the Committee will result, this paper will merely attempt to highlight specific areas of general interest. This discussion will also be limited to passenger car tests, although a large part of the Committee's work has been with trucks, particularly the problem of jackknifing of tractor-trailer combinations.

In February, 1939, the Traffic Section of the National Safety Council appointed the Committee on Winter Driving Hazards. The primary objectives of this Committee have been to develop comprehensive and authoritative information concerning the movement of vehicles on icy and snowy surfaces, and to gather and evaluate data on driving practices, techniques and aids to winter driving. During the past 16 years, the Committee has conducted tests on lake ice and snowy roads and under all types of winter weather conditions. Many thousands of dollars worth of vehicles, equipment, and manpower have been made available for these tests. Industry, government agencies, and educational institutions have cooperated in all phases of the operations.

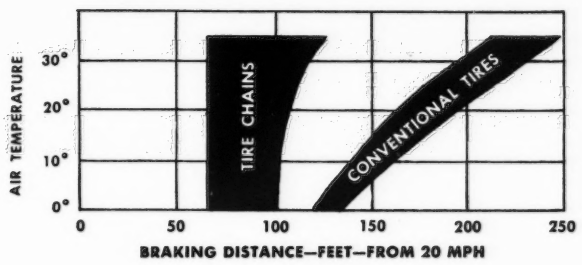
Equal in importance to the test projects have been the Committee's public education program, aimed at informing public officials and motorists of the special hazards of winter driving, and recommending to them practical measures to overcome these hazards. This intensive educational program has included the distribution of hundreds of thousands of leaflets, booklets, newspaper releases, magazine articles, cartoons, sponsored advertisements, radio programs and transcriptions, movies, TV spots and trailers, film trailers and many other items.

To most people concerned with street and highway traffic all through the year, the special problems of winter are quite obvious — reduced visibility and inadequate traction. The Committee has investigated many facets of these special problems, with primary focus on those points involving inadequate traction. However, the importance of good visibility cannot be neglected. The major emphasis on this part of the problem can be found in the public education activities of the Committee, since the subject does not lend itself readily to field testing. The problem of being able to see danger to avoid it is emphasized in the wintertime by three basic elements:



Lighting	Winter brings more hours of darkness and also brings the opposite extreme of intense glare of sun on ice and snow.
Inclement weather	Even in those geographical areas where ice and snow do not abound, the incidence of fog and mist and the dangers of rain and sleet storms increase in winter months.
Driver vision	In winter the windshield and other glass around the car is often covered with snow, frost, mud spattered by other cars, or condensation on the inside, and the drivers must be particularly watchful of snowbanks and other roadway impediments.

EFFECT OF TEMPERATURE ON BRAKING DISTANCE ON SMOOTH ICE



One of the most important facts discovered and confirmed by the Committee involves the effect of temperature on the slipperiness of icy surfaces. Many people have noticed that an ice cube is sticky and not very slippery when first removed from the refrigerator, but it becomes quite wet and slippery as it is warmed by room temperature. The very first tests made by the Committee in 1939 indicated that something like this was true with regard to driving on icy roads and that factual information was needed on the subject. Accordingly, in February, 1940, at Lake Cadillac, Michigan, an extensive series of tests was conducted to obtain braking distances of tires and tire chains over a range of temperatures from 0°F. to 32°F. The facts in Figure 2 have been checked many times over the years as recently as January, 1955, and have shown a remarkable consistency.

According to these facts, the braking distance of a passenger car equipped with regular tires may vary from 110 feet at 0°F. to 250 feet at 32°F., a difference of 140 feet. This action of ice in response to temperature has become an important part of the public education phases of the Committee's activities and has become a major factor in all test activities. A careful record of ambient air temperature and ice temperature is always maintained during any type of test work. Snow is also affected by temperature variations, but the effect is not as great and is usually not as significant as the variations in the consistency and texture of the snow. It is interesting to note that the temperature effect is not as marked when tire chains are used. This fact may be explained when it is noted that the tire chains actually bite into the ice while tires depend on the coefficient of friction between the tread and the ice surface.

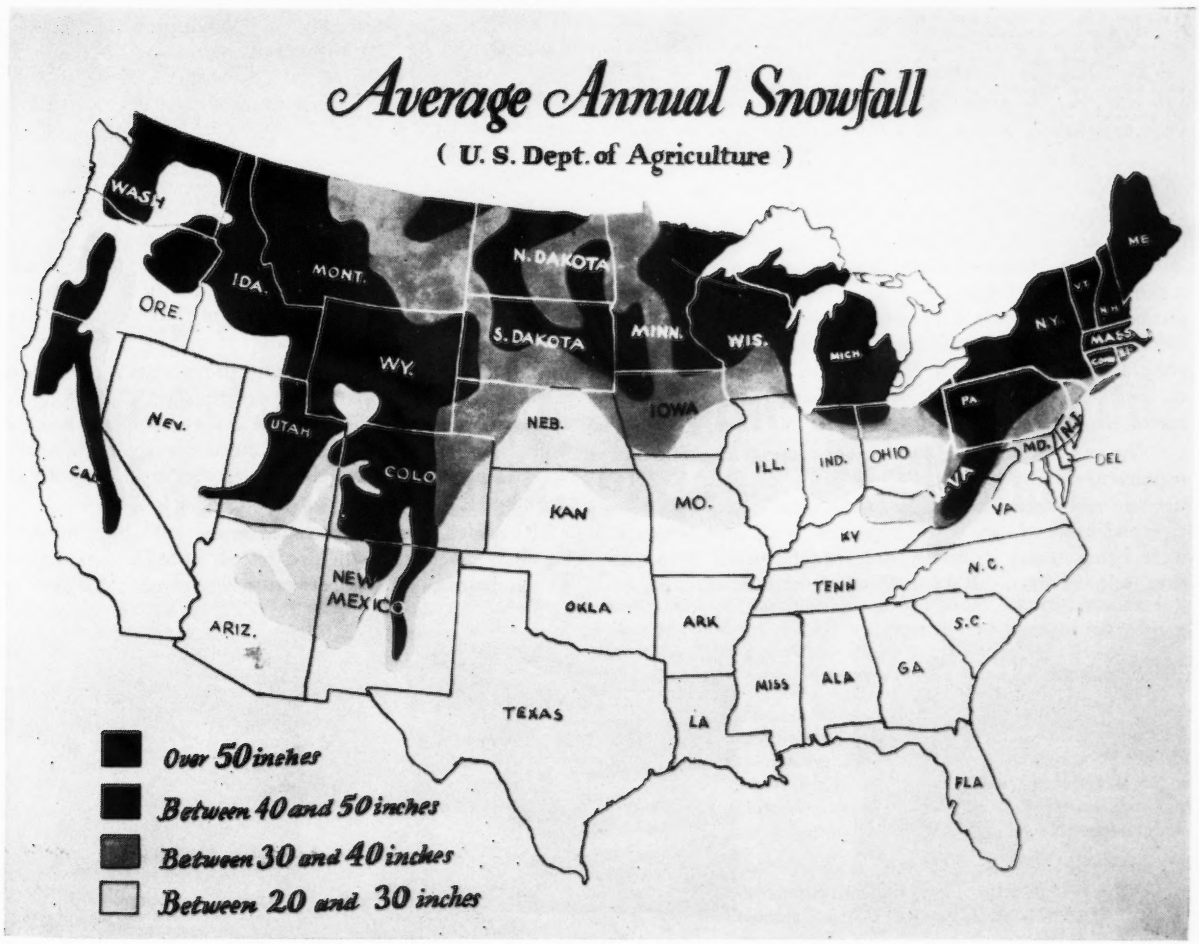


Fig. 3

This map shows that in general the states furthest north get the most snow. It brings up the perennial argument as to whether it is more difficult to drive in the northern portion of the snow belt or in the southern part. Motorists in the northern portion have better traction than those further south where the alternately freezing and thawing weather makes roads more slippery, resulting in extremely poor traction and more hazardous driving conditions.

Clintonville Tire Tests

Probably one of the most interesting and controversial test projects conducted by the Committee has been the testing of various types of snow tires designed for use in winter. A series of tests was run in 1950 and 1951, and the results were given wide circulation. During the next few years, tire manufacturers claimed increasingly better products as a result of research and development, and the demand for more recent data began to mount. In January, 1955, another tire test project was run to satisfy that demand. The site of these tests was Pine Lake, outside of Clintonville, Wisconsin.

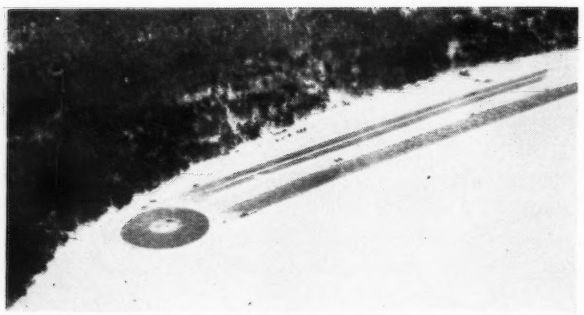


Fig. 4

"Skid Row" on Pine Lake near Clintonville, Wisconsin. Most of the test area is shown in operation, with the exception of a 400 foot diameter circle which is off the picture to the right. At the south end is the "Maypole" circle, used for the restrained cornering tests, cleared to more than 200 feet in diameter. Thie wide ice strip, about 100 feet wide and 1000 feet long, was devoted to truck operations. The two narrow strips, each more than 50 feet wide, were for braking and traction tests. On the shore side of these strips, a packed snow course was located, with an access and parking area immediately adjacent to the shore.

Some criticism has been directed at the Committee for doing its test work on lake ice rather than on actual roads as used by the public. However, it should be kept in mind that it is necessary to eliminate as many variables as possible in order to obtain comparative data on those variables being tested. A prepared glare ice surface on a frozen lake has proved to be the most consistent surface available. Furthermore, extreme conditions of glare ice often occur on highways and the efforts of a winter public education program, based on these tests, should be aimed at preparing drivers for the extreme conditions they may encounter.

Test vehicles furnished by three of the major automobile manufacturers included three identical cars with 6.70x15 tire size and three identical cars with 8.00x15 tire size. The type and make of cars is not important since tires, not cars, were being tested. Fourteen tire manufacturers submitted tires, selected by the Rubber Manufacturers Association, to be tested. Sixty sets of tires were included in the program, including a pair of tires in each of the two tire sizes and including control tires, regular tires, and recapped tires. A set of regular tire chains and a set of reinforced tire chains in each of the tire sizes were also included. Additional equipment and personnel were made available without cost to the Committee by more than 40 companies, associations, universities and governmental agencies.

The project was under the administrative control of the Secretary of the Committee on Winter Driving Hazards. The tests were under the direct supervision of Professor A. H. Easton of the University of Wisconsin, Chairman of the Subcommittee on Testing, and George A. Stonex of General Motors Proving Ground, Vice-Chairman of the Subcommittee.

Test Procedures

As soon as four to six inches of ice formed on the lake, preparation of the test area was started. Snow on top of lake ice acts as an insulator and must be cleared in order to obtain maximum ice thickness. To prevent the ice from settling or breaking up under the weight of windrows of snow, it was necessary to move the snow from the center of the lake toward the shore.

All tires to be tested were new production tires, broken in on the road for 200 miles prior to arrival at the test site. Each tire was photographed and a number, which was its only identification thereafter, was painted on the sides with yellow paint.

Two sets of control tires were used. One tire was run about once an hour on every third series of test runs as a surface control to account for variations in temperature and test surface. Four regular highway type tires of popular make were the control tires designated as "regular" tires in later analyses. The regular tires were included in the normal test procedure, with the surface control tires being the only ones repeated at regular intervals.

Tire chains are usually included in tire tests because their performance is compared to tire performance. The techniques used for tire chain tests were the same as for tires and the same types of tests were used. Since tire chains normally lacerate the test surfaces, these tests were held up until all the other tire tests were completed.

Retreaded tires were included in the 1955 tests, numbering about one-third of the tires tested. Since the data showed no significant difference between new and retreaded tires of

Fig. 5

Preparation of test area. Initial snow clearance of a section of the lake about half a mile long and 400 feet wide was done by jeep snow plows. As the ice thickness increased, the heavier snow removal jobs were assigned to the 350 HP airport maintainer on the left. The ice course was shaved with a sharp underbody blade, in the center picture, leaving an even and uniform surface. Finally, the rotary broom shown to the right removed the shavings and loose snow blown over the area. The latter vehicle was in almost continuous operation, keeping the test courses free of the snow that constantly drifted across the lake.

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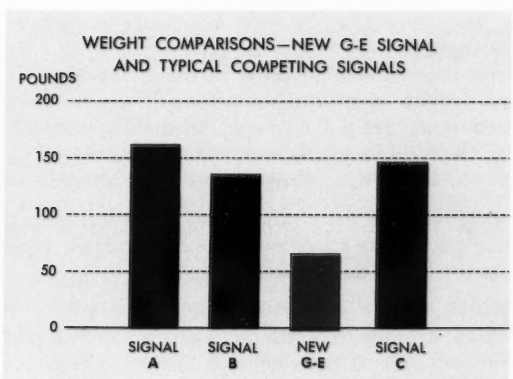

COMPARISON SHOWS that the new G-E aluminum signal is less than half the weight of its lightest competitor. Chart based on comparison of 3-color, 4-way, adjustable span-wire suspended signals.

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Fig. 6
Parking and access area. To the right is the packed snow course which was prepared by blading eight to ten inches of snow over the ice and packing it down by means of a parade of vehicles driving over it repeatedly. Efforts to achieve a satisfactory snow course were hampered by lack of snow, probably the first time the Committee complained when it did not snow. Toward the end of the test period, it was found that the parking and access area presented a better packed snow surface than the snow course, and most of the snow testing was done there.

the same or similar tread designs, no attempt was made to differentiate between them, and the retreaded tire data were averaged in with the new tires.

Braking Tests

Tests to measure stopping ability were made from an initial speed of 20 mph to rest, with the wheel locked. Speeds were determined by a trailing fifth wheel speedometer and distances were measured by means of electronic decade counters attached to the same fifth wheel. Test tires were applied only to the rear of the car and the front tires were kept constant throughout the testing.

The technique used required the driver to accelerate

Fig. 7
Tire changing pit, located at the north end of the test courses. The truck trailer parked in the background provided storage for tires, jacks and other equipment. The pit was so located as to be easily accessible for test vehicles entering and leaving the test courses. Personnel assigned to the tire pit kept a record of the tires as they were placed on the test cars for the various tests.

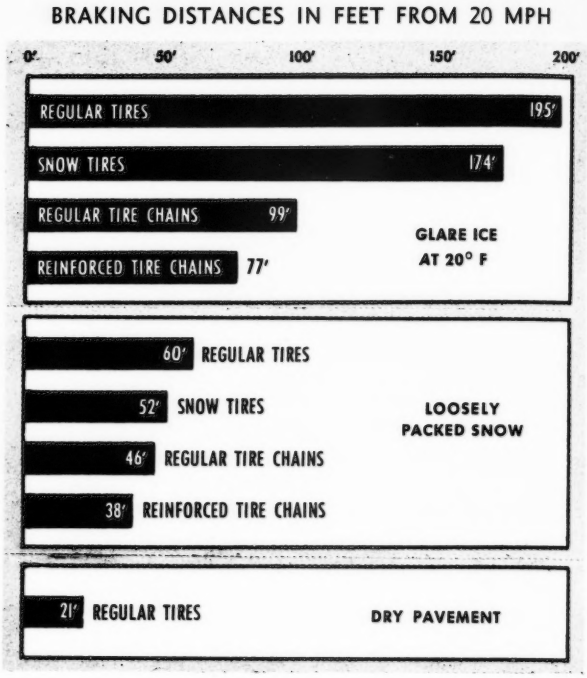


Fig. 8
Comparative stopping ability. These braking distances, which do not include reaction time, are the averages of hundreds of test runs and are typical of what may be expected under similar conditions on the highway. It must be kept in mind that variations in weather, temperature and surface will materially change these values.

the vehicle to a speed slightly in excess of 20 mph, remove his foot from the accelerator and poise it over the brake pedal. When the speedometer needle dropped to exactly 20 mph, the driver applied the brakes so as to lock the wheels and simultaneously started the decade counter. Generally, four runs were made in each direction.

Traction Tests

The ability to go was measured by three types of traction tests: slip, static and dynamic. In each of these tests, tires to be tested were on the rear wheels of the test car and the front tires remained constant. Two cars were used for these tests, with the holdback vehicle restraining the leading test vehicle by means of a steel cable connecting the two.

Slip traction is obtained when both vehicles are advancing at a given ground speed, held constant by the holdback vehicle, but the tires on the front vehicle are spinning at a given percentage greater than the ground speed. This technique requires the use of intercommunication equipment between the two vehicles so that the two drivers can coordinate their speeds. The pull is recorded when the given percent slippage occurs. In these tests, a ground speed of about 2 mph was used and data was taken at approximately 200% slip.

Static traction is the maximum pull recorded when the test vehicle is held stationary while power is gradually applied until the tire breaks traction and spins.

Dynamic traction involves both vehicles moving at the same speed, with the front vehicle gradually applying power until the tires break traction and spin. The strain gauge reading at breakaway is recorded. This test presents difficulties in the holdback vehicle maintaining a constant speed while the test vehicle attempts to steadily accelerate.

Fig. 9
Traction test in operation. The lead car is the test vehicle, with test tires on the rear wheels. The holdback vehicle maintains a constant ground speed by use of motor compression, brakes or even reverse gear. The steel cable connecting the two vehicles has an electric strain gauge in series, which registers pounds of pull on a meter in the test car.

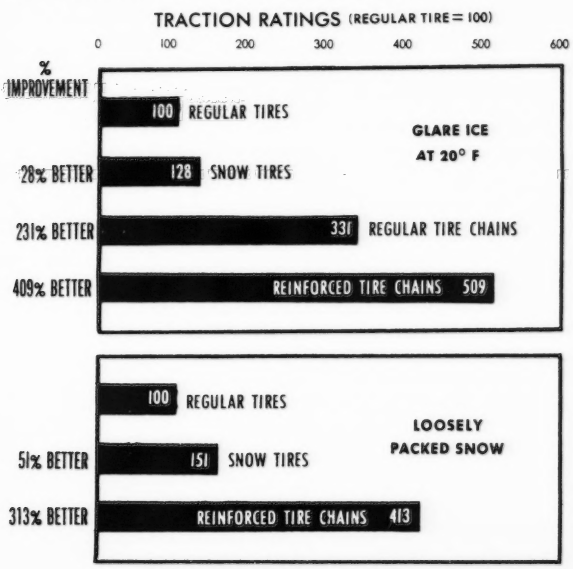


Fig. 10
Comparative starting ability. These traction ratings, also expressed in percent improvement, represent the averages of hundreds of test runs. Ratings are obtained by setting the average drawbar pull of regular tires as an index of 100, and then expressing the other average drawbar pulls in terms of that index.

Cornering Tests

Cornering is a term used to describe the ability of a vehicle to turn a corner or traverse a curved path. This test consisted of driving the test vehicle around the 400 foot diameter ice circle and gradually increasing the speed until the test tires on the rear were no longer able to hold the car in its path. The speed at which the rear tires slid out was used as an index of the tire's performance. Some difficulty was experienced in holding the front end in until the rear end slid out, and in many cases it was necessary to use some of the better test tires on the front wheels to hold them in.

Cornering speeds during the 1955 tests varied from less than 10 mph to almost 30 mph, depending on the tires used and the temperature. Using the average speeds of the regular

Fig. 11
Two test vehicles engaged in cornering tests on the 400 foot circle. The shaved ice lane is 12 to 15 feet wide, with the remaining 30 to 40 feet of cleared area left in its rough state or with a thin snow cover. Whenever a test vehicle slid out, as in this photograph, it was possible to recover control quickly and continue around the circle. This technique eliminated fears that the test vehicle might spin out of control into the snow bank which resulted from plowing the snow cover on surrounding the ice. While this would not have been harmful to the car, it might have proved disastrous to the fifth wheel speedometer.

tires as a rating index of 100, it was found that the ratings of test tires varied from 91 to 124, with an average of 105.

Restrained Cornering Tests

In these tests, run on an ice circle 100 feet in diameter, the test vehicle was restrained by steel cables attached to a rotating pivot mounted on top of a telephone pole sunk through the ice into the lake bottom. The cables were attached to a frame built on the car, as shown in Figure 12.

The test vehicle was operated at a speed high enough to develop centrifugal force greater than the maximum steering force. This enabled the front wheels to be turned from the extreme right to the extreme left and back without varying the direction of travel of the car itself. Electric strain gauges were placed in the cables, the output being recorded by an oscillograph in the test car. This oscillograph also recorded the speed from the trailing fifth wheel speedometer and the angle of the front wheels.

Since the direction of travel of the test car was constant, the angle formed by that line and the direction of the front wheels at any instant was the slip angle. Thus the data enabled the plotting of side forces developed by the front tires over a wide range of slip angles.

So far, the restrained cornering tests have been in the nature of pilot studies, to determine proper test techniques

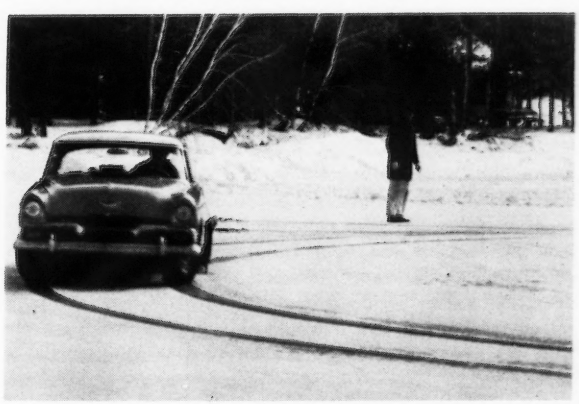


Fig. 12
Restrained cornering test in progress. The two cables are attached to the framework built on the car in such a manner that the points of attachment are at the height level of the center of gravity of the car and the extension of the line of the cables intersects the center of the front and rear axles. Note that the front wheels are turned out, but the direction of travel of the car is held constant by centrifugal force acting through the restraining cables.

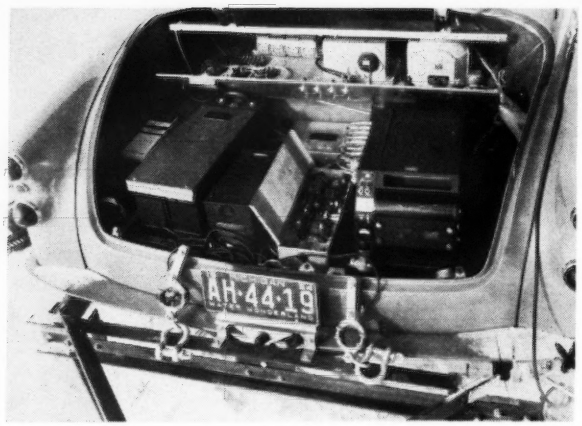


Fig. 13
Oscillograph and other electronic instruments used in the restrained cornering tests. By means of strain gauges and potentiometers, this instrumentation measures forces in the restraining cables, steering angle, time and speed. All these data are recorded on a pressure sensitive tape which runs through the oscillograph at a constant rate.

and to find out what information can be obtained in this manner. The major conclusions reached up to this point indicate that maximum turning force is obtained at very small slip angles, in the order of 3° to 5°, and that good tire treads are of great importance on front tires when driving on ice and snow. Oversteering will not give greater turning force but will actually reduce it.

Evaluation

The current project of the Committee on Winter Driving Hazards is the conducting of a detailed evaluation of past activities and the planning of future testing. It is hoped that one of the results of this evaluation will be the compilation of a report which will include all the major findings of past tests, with supporting data. If gaps in available information are found, or if additional supporting data are needed, the necessary test work will be scheduled for the future. New avenues of investigation will be discussed, as well as new and improved testing techniques.

The Committee firmly believes in providing information on *HOW* to drive safely under the hazardous conditions prevalent during winter, and intends to continue seeking factual data on which to base such important driver education.

WEIGHING TRUCKS IN MOTION AND THE USE OF ELECTRONIC SCALES FOR RESEARCH

(Continued from page 199)

Maintenance Problems

Maintenance problems were encountered with rather disturbing frequency during the first month of operation. Considerable trouble with vacuum tube failures appeared to have been solved by the installation of voltage regulating equipment. Another major trouble stemmed from moisture condensation on the electronic equipment in the scale pit. Steps to correct this moisture condensation included the sealing of the cracks around the edge of the weighing platform with mastic to eliminate the free flow of water into the pit. In addition, a space heater and dehumidifying unit were installed in the pit.

The maintenance problems encountered have normally been within the abilities of a competent radio technician, however, the manufacturer's representative has been called on occasion to help find the source of the difficulty.

R.C.A. Service Company, Inc. of Camden, New Jersey makes available a standard service agreement which provides for periodic inspection, emergency service, and replacement of parts.

General

It would be desirable to operate a scale of this type full time. This could be done if it were possible to leave the installation unattended. To do so it would first be necessary to modify the actuating equipment so that passenger vehicles would not actuate the recorder. Although it would be desirable to have the equipment record the time of day that each vehicle was weighed, the principal drawback to unattended operation is the recorder tape. Any full time operation which included passenger vehicles would use a roll of tape so fast that it would be necessary to replace the rolls frequently. There is the additional possibility that a vehicle might actuate the starting mechanism and fail to trip the stopping mechanism, as in a passing maneuver, and the tape would then be quickly exhausted.

From the comprehensive weighing program which was conducted during the period from November, 1954 to March, 1955, a sampling period was determined which gave a representative sample of axle weights rather than vehicle types. This sampling period required operation between 2:00 A.M. and 10:00 A.M. on Monday, Tuesday, Wednesday, and Thursday each month. Beginning May 2, monthly samples were taken, which program will be continued throughout the period when heavy traffic uses the test section. When the samples are expanded to give a total for the month in question, the average error is less than 10 per cent.

Equivalent 5,000 pound wheel loads have been computed for each month since November, 1954. Ultimately this information will be related to pavement performance. The axle weights vary considerably by direction. Southbound loads are consistently heavier than northbound. This is apparently due to the fact that most of the petroleum products used in the Willamette Valley are transported by truck from Portland, and the petroleum trucks are not loaded on their return trip.

From the experience to date with the electronic scale, several recommendations can be made for improvement in operating conditions at new installations. They are as follows:

1. Fix the slab horizontally either by preloading as described in *Public Roads* or by welding thin strips to the corners of the platform and the channels which form the edge of the pit.
2. Replace the road tubes with pressure-sensitive detectors which would be set so that axles which do not exceed 4,000 or 5,000 pounds would not energize the scale.
3. Install adequate air conditioning equipment in the pit to maintain reasonably constant humidity and temperature, or as an alternative construct the pit so that there is sufficient ventilation to eliminate heavy condensation.
4. Locate the scale with relation to existing pit scales or loadometer pits so that calibration tests can be made conveniently.
5. Installation of a time clock in conjunction with the recorder to stamp time of day on the tape.
6. Construct the columns containing the load cells so that adjustments can be made after the scales have been balanced and put into operation.
7. Install voltage regulating equipment to avoid damage to the amplifier and recorder through variations in line voltage.

A New Approach to Traffic Controller Specifications

By Richard A. Overmyer (Assoc. Mem., ITE)
Assistant Traffic Engineer, Philadelphia, Pennsylvania

PRIOR TO 1953 traffic signal controllers in Philadelphia were purchased on the most elementary of functional specifications. The prices paid for equipment under these specifications were low but the equipment obtained was usually minimal in functional capabilities and often minimal in quality.

Beginning in 1953 the ITE-ASA specifications were used for the fixed time control equipment ordered that year. Also beginning with that year some electronic equipment was ordered, and here again the appropriate ITE-ASA specifications were used. It was felt then that ITE-ASA specifications would be sufficient to protect the city against inadequate control equipment.

When samples of the electronic equipment being bid were received late in 1953, it was evident that major differences in design existed between the various makers' equipment. The City Traffic Engineer's office felt that obtaining long-life equipment which would keep maintenance requirements to a low level was an engineering must, and also wanted to be sure that the equipment accepted would functionally meet the specifications in every detail.

In Philadelphia our Traffic Engineering organization has neither the personnel nor the testing facilities in its own organization to conduct the detailed technical studies in the electrical engineering field necessary to determine expected life and fully evaluate functional capabilities of equipment. It does, however, have available the services of two consulting engineers who have long experience in the electronic field, particularly in the field of controls and who, in addition, have considerable experience in the traffic control field in the application of traffic signal controllers and their functional requirements.

These two engineers, Messrs. Edward E. Pearson and Lionel M. Rodgers, were asked, late in 1953, to make independent studies of the various electronic controllers offered, and to submit reports and to agree upon recommendations.

All controllers under bid were given functional tests by Messrs. Pearson and Rodgers to determine whether they met ITE-ASA specifications and those controllers which met functional requirements were then independently studied by each of the two engineers for design acceptability, component quality and ratings, and circuit stability. Particular attention was given to factors which would tend to cause field failures or require frequent servicing.

Since the independent reports of the engineers were in substantial agreement on each of the items under study, their joint recommendations also presented a unanimity of opinion. It is of interest to note that in no case was the equipment which they recommended the lowest bid. The engineers also recommended that specifications be prepared that would specify quality as well as functional performance for all future control equipment purchased, so that suppliers would be on notice as to the criteria for the purchase of control equipment.

The same two engineers were then requested to prepare specifications in accordance with their recommendations. Since considerable trouble had been experienced with short motor life in fixed time equipment, they were asked also to prepare quality specifications for fixed time control equipment. The resulting specifications for both electronic and fixed time equipment are believed to represent a new approach—at least in the traffic signal control field—and to be worthy of some description here.

The first premise in the preparation of these new specifications was that no attempt should be made to tie the equipment designer to any preconceived existing ideas in the minds of those preparing the specifications. While this made the specifications much more difficult to prepare, it was felt that to do otherwise would be to put a brake on progress and stifle healthy competition between equipment suppliers. The second premise was that although it was expected the evaluation of equipment offered under the new specifications would be carried out by engineers "skilled in the art", that is, engineers familiar with components and design for long life electro-mechanical and electronic equipment, enough information of readily interpreted nature is required to enable engineers not particularly skilled in the electronic engineering art to make a reasonable evaluation.

The specifications for all controllers were prepared in three sections. Section I is common to all traffic signal controllers and sets forth the basic engineering conditions of purchase including the submission of samples, the right of rejection and the right to return of material which has failed to meet specifications. Section II is specific to either fixed time or electronic controllers, and represents the quality part of the specifications. It is this section which establishes minimum performance, sets forth the required data on components of certain types, calls for life test data, and requires an engineering statement as to required tests which have been made by the manufacturers. Section III sets forth the required function of the controller and applies only to one type of controller, there being an individual specification for each type of controller.

Each request for bid, therefore, refers to three specification sections: the general section for all controllers, the fixed time or the electronic section, and the particular functional section.

Experience with fixed time controllers showed that they had one notable weakness—motors. It was felt that relative small cost increases in motor design could result in a major betterment in performance and a great saving in maintenance. Life test data is required on fixed time controller motors when they are run with the shortest cycle gear—and therefore subject to the highest torque. In addition, an expected

survival curve based upon life test data covering a period of at least five years is required for all such motors. Life test data on other components is also required. In addition, the overall guarantee period is increased from one to two years, and it is expected that as manufacturers bring up their standards it will be possible to increase this guarantee period to a five-year base. It is also expected that controller manufacturers will develop as a result of the requirement of longer guarantee periods, self-lubricating techniques which will eliminate the need for periodic oiling. Since the excessive use of oil in controllers is one cause for the failure of electrical parts, and since insufficient oil is the cause of mechanical wear, if the need for oiling can be eliminated, then it is reasonable to believe longer life of both types of components will result.

Electronic controllers are more apt to fail because of breakdown of electronic components than for any other reason. A large number of electronic components are known by electrical engineers who specialize in the field to be free of tendencies toward early failures. Others are known to have limited life, and to be abundant sources of trouble. Still others have lives which vary radically depending upon quality and application.

A number of types of components are listed in Section II of the electronics specifications as "preferably avoided". It is realized, however, that these components cannot be always avoided, and it would not necessarily be desirable to do so. The thus listed types of components may be accepted, subject to proof by the controller manufacturer through life test data and derating information that they will give satisfactory service in their circuit application. An example of such components are electrolytic condensers. Our consultants advise that the life of an electrolytic condenser depends on several factors, which include materials and controls in manufacture, ambient temperature conditions in use, the peak currents to which they are subjected, and voltage derating. They feel that electrolytic condensers of the telephone type, when operated within their rating and at suitable maximum temperatures would be completely satisfactory for any traffic signal control equipment whereas certain of the cheap "radio replacement" type of electrolytic condensers would be unacceptable no matter their application. Other types of electrolytic condensers fall between these two extremes and must be considered on their own merits. Thus, had the use of electrolytic condensers been prohibited, the designer would have been unduly limited in his use of what, under some circumstances is a perfectly satisfactory component, but if no restriction were placed on the use of these components they could be used indiscriminately with unfortunate end results. The former might well result in higher equipment costs without better end results while the latter would result in higher maintenance costs. Similar consideration and study must be given to each of the other components used ranging from transformers to vacuum tubes to insure that the controller will provide the most satisfactory performance with a minimum of maintenance.

It is expected that the new specifications developed in the manner described will tend to bring about the desired result of fewer failures and lower maintenance in a number of ways. First, they put the equipment manufacturers on notice that their designs are going to be given engineering studies on not only a functional performance basis, but also on a quality basis. Manufacturers are thus put on a competitive basis from a standpoint of good engineering and not merely low price. The long range effect of this should be to better the quality of design of traffic signal control equipment. Second, the specifications will result in Philadelphia's Traffic Engineering office being provided with sufficient information on the equipment purchased to enable us better to foresee our future maintenance needs and plan for them. Third, by requiring better equipment they help us to hold our emergency maintenance needs to a minimum and thereby enable us to devote more manpower to our preventative maintenance program thus bettering the service which our signals render.

Interstate System — Facts Discussed By NHUC

The Interstate System (set by law at 40,000 miles) embraces about 1.2 per cent of our total road mileage, joins 42 state capitals and 90 per cent of all cities over 50,000 population. It carries more than one-seventh of all traffic, one-fifth of all rural traffic and directly serves 65 per cent of the urban and 45 per cent of the rural population.

Recent additions of 2,300 miles to the Interstate System, bringing the mileage to its statutory limit, will substantially increase service of the System in urban areas, where congestion is critical.

One of the purposes of the System, according to the law which created it, is "to serve the national defense." Routes have been designated with this purpose in view. Selection of routes is made jointly by the state highway departments and the U. S. Bureau of Public Roads.

The first specific authorization of funds for the Interstate System by the Federal Government was for the fiscal years 1954 and 1955 in the amount of $25 million annually. This was raised to $175 million annually in the Federal-Aid Act of 1954. At the present rate of modernization it is estimated that it would take more than 50 years to reach even a tolerable level of efficiency.

A study by the Bureau of Public Roads, prepared in 1954, finds that only 15 per cent of the mileage as it now exists fully meets contemplated standards. This study indicates that for nearly 7,000 miles, a two-lane road would be adequate, with the bulk of needed improvements falling in the more than 28,000 miles which should be in the four-lane divided highway category, and in the 2,300 miles (principally in and around heavier populated areas) which should be six or more lanes wide.

Needed work on the Interstate System for the ten year period, 1955-1964, according to state estimates compiled by BPR, pursuant to Congressional directive total $27 billion, of which $12 billion is in rural and $15 billion is in urban areas.

The general interest in bringing the Interstate System up to standards of adequacy was underlined recently when a National Highway Users Conference study disclosed that the System touches or crosses 406 of the 435 Congressional Districts - or 93 per cent. The study also indicated that many of those Districts not touched or crossed by the System are missed by only a few blocks and are actually served by it. Thus, on the basis of Congressional Districts interest in the Interstate System is seen to include virtually every section and segment of the population.

Chicago Controls Traffic Signals With Radio

THE CHICAGO TRAFFIC SAFETY REVIEW *published monthly by the Citizens Traffic Safety Board of Metropolitan Chicago devoted most of its November 1955 issue to the new radio controlled Traffic Signal System which went into operation November 15th. Because of wide interest in the new system* TRAFFFIC ENGINEERING *herewith reproduces much of the* TRAFFIC SAFETY REVIEW *article.*

Regulation of traffic by radio controlled, electronically mechanized signals was introduced to Chicago motorists at 13 street intersections on November 15.

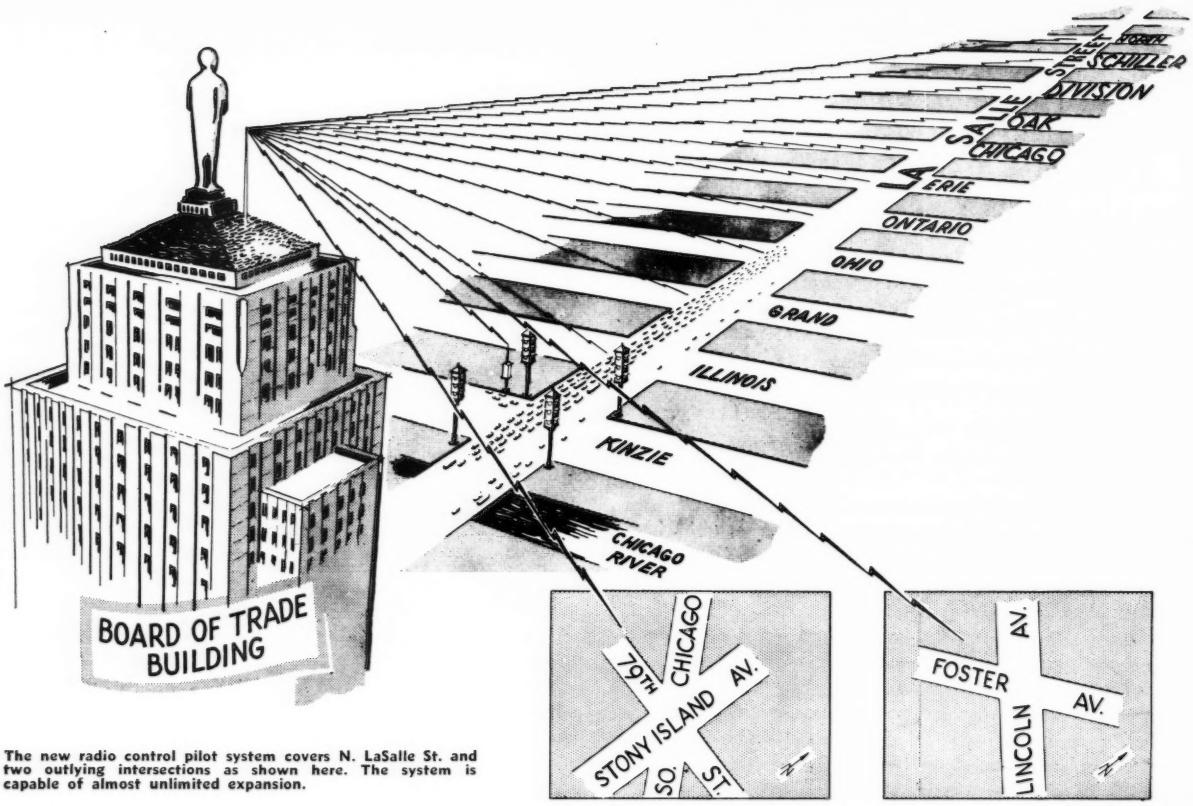
The revolutionary control system, believed to be the first of its kind in the world, went into operation as Mayor Richard J. Daley pressed a button in the traffic signal control center in the City Hall basement. Radio signals took over operation of 11 traffic signals on N. LaSalle St. between Kinzie St. and North Ave., the complicated three-street intersection at 79th St., Stony Island and S. Chicago Ave., and the intersection at Lincoln Ave. and Foster Ave.

The new traffic signal system was developed and engineered by Ralph F. Michel (Mem., ITE), Associate Traffic Engineer of the Bureau of Street Traffic which is under the supervision of City Traffic Engineer Leslie J. Sorenson (Mem., ITE). Equipment was manufactured by the Electronics Division of the General Electric Company. It was decided to make the initial installation at an estimated cost of $50,000 only after every other known method was explored, including the possible use of electric utilities equipment and telephone cables.

The $50,000 pilot system includes a central control station located at City Hall and a transmitter and antenna on the roof of the Board of Trade Building. The control station is linked to the transmitter by underground cable. Coded radio tone signals are transmitted to electronically equipped stop-and-go signals at the intersections along N. LaSalle St., and to the two outlying intersections.

Remote control of the traffic signals makes it possible to change the timing schedule on which the signals operate several times a day. This is necessary to accommodate changing traffic conditions or traffic flow. On La Salle Street, where southbound traffic predominates during week-day morning rush periods, traffic signals under the new system are now set by radio so the heavy southbound flow of cars and buses can move through the 11 signalized intersections at 30 miles an hour. They are changed to a compromise or equal flow schedule during mid-day, and then changed again to favor the heavy afternoon and evening flow of traffic north from the Loop. The most desirable signal timing is put into operation automatically each day, but can be modified as often as necessary to facilitate movement of traffic. Signal timing requiring slower speeds can be placed into operation when normal speeds cannot be maintained because of inclement weather.

Mayor Daley throws switch in control room in City Hall basement to inaugurate operation of new system as (left to right) Lloyd M. Johnson, Commissioner of Streets and Sanitation; Ralph Michel, Associate Traffic Engineer who conceived and planned the system, and City Traffic Engineer Leslie J. Sorenson watch.



The new radio control pilot system covers N. LaSalle St. and two outlying intersections as shown here. The system is capable of almost unlimited expansion.

The equipment consists of a Master Controller, Master Tone Coder, Radio Transmitter, Intersection Radio Receiver, and Tone Decoder, and Intersection Controller.

The Master Controller and Master Tone Translator are located in the traffic control center in the basement of City Hall. The Master Controller determines what signal timing schedule is to be placed into effect for a particular group of traffic signals.

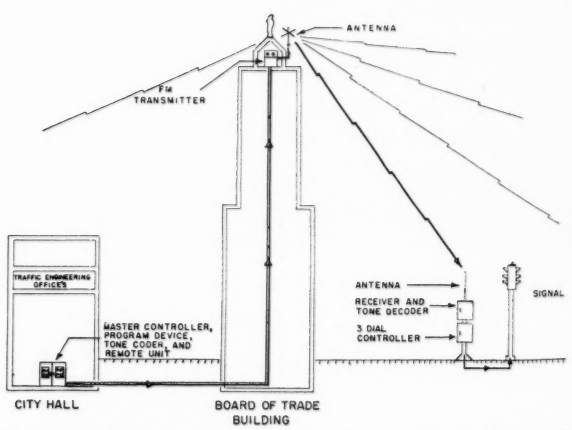
The Master Tone Coder receives signals from the Master Controller and converts the signals into tone pulses which are carried by wire to the Radio Transmitter. The transmitter, located atop the Board of Trade Building, broadcasts the tone pulses over the entire city as an FM signal. Each intersection under radio control is equipped with a Radio Receiver and Tone Decoder. The receiver accepts all tone pulses transmitted from the Board of Trade Building and passes them to the Tone Decoder which accepts only the pulses intended for that particular intersection. All others are rejected. The pulses synchronize the signals periodically and also change their schedules to fit prevailing traffic conditions.

The efficiency with which any traffic signal system permits traffic to move depends on a number of factors—traffic capacity of the roadway, spacing between signals, variations in traffic volumes, pedestrian movements, turning movements, parking, weather, and road conditions. Few if any of Chicago's 1,500 traffic signals operate under ideal conditions. Many thoroughfares lack sufficient capacity, signals are irregularly spaced, traffic volumes fluctuate severely, and improper parking is prevalent.

While it is not possible to overcome all of these faults by improvement of traffic signals alone, congestion can be reduced substantially by wider use of a flexible control system such as is now being pioneered on LaSalle St. After the test period the system is expected to be expanded to cover many other intersections on heavily travelled thoroughfares.

Before the new radio system was installed, signals on La Salle St. operated on a fixed schedule which favored neither direction of travel. Although signals performed adequately during off-peak periods, motorists were subjected to congestion during rush periods. As on many other thoroughfares, the signals on the street are spaced irregularly and the traffic volume it carries fluctuates considerably.

To supervise or control the timing of traffc signals so they keep in step, which is a primary objective, and so that timing schedules can be altered to fit hourly changing traffic



The schematic diagram below shows the radio control components of the new system. It is the first installation of its kind and was developed by Chicago traffic engineers in cooperation with the Electronics Division of General Electric Company.

conditions, a master controller and some means of communication between this controller and the intersection are necessary. Until radio was adapted, supervision was possible only by use of specially installed interconnecting cable, or in some instances, leased telephone circuits.

The city now has centralized traffic control in the Loop district, which is operated as a cable system from a control room in City Hall. Loop traffic through 78 intersections will continue to be regulated by this means, but expansion of the system is very costly. In addition to the cost there are inconveniences and serious disruptions of traffic which result from digging miles of trenches necessary to accommodate conduits for the control cables.

Radio control is more versatile and its installation costs are far less than for most cable-connected systems. Its greatest advantage lies in its capacity for rapid expansion. In many locations installation of receiving equipment at the intersection will be all that is needed to place signals under radio control. Some enlargement of the master controller will be required for certain installations but the cost will still be low compared to the cost of installing cable.

City engineers are hoping that radio control can be extended to 450 intersections on Chicago's important thoroughfares. Interconnecting cable for such control, would cost approximately $3,375,000, three to four times more than the cost of expanding the new radio control system.

Use of radio in supervision of traffic signals is only one of its many possible applications in the field of traffic control. It may be used eventually to change speed limits to fit weather and road conditions, and to operate signs prohibiting turns and other vehicular movements at certain periods.

Before the decision to use radio was made, every other known method was explored including electric utility and telephone circuits. A singular accomplishment by Chicago engineers was to persuade the Federal Communications Commission to grant a license to transit control signals. The request was unusual. The Commission was obliged to make a special ruling establishing a new channel on 27.255 megacycles for traffic control purposes.

CHICAGO COUNCIL COMMENDS MICHEL

Mayor Daley (right) in photo above presents Associate Traffic Engineer Ralph F. Michel with the resolution passed by City Council commending him for his work on the radio controlled traffic signal system described on these pages. Resolution is reproduced at right and praises Michel who is the 1956 President of the ITE Midwest Section.

THE COUNCIL'S RESOLUTION

WHEREAS, As an associate traffic engineer in the Bureau of Street Traffic and Parking of the City of Chicago, Mr. Ralph Michel was assigned the duties of research in the field of traffic signal control by every possible method; and

WHEREAS, Mr. Michel was engaged for several years in research leading to the development of coordinating and interconnecting traffic signals for the betterment of traffic conditions; and

WHEREAS, Working with engineers of the General Electric Company a system of radio control from a central control location was perfected, which resulted in the first installation of its kind in the world; and

WHEREAS, This system is now operative on LaSalle Street from W. Kinzie Street to W. North Avenue; at the intersection of E. Seventy-ninth Street, S. Stony Island Avenue, and S. South Chicago Avenue; and at the intersection of W. Foster and N. Lincoln Avenues;

Now, Therefore, Be It Resolved, That we, the members of the City Council, in meeting assembled this 9th day of December, do hereby commend and compliment Mr. Michel for his perseverance, his engineering skill and resourcefulness, and his loyalty to the City of Chicago in this outstandingly successful work of research.

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STATE OF ILLINOIS, } SS.
COUNTY OF COOK. }

I, JOHN C. MARCIN, City Clerk of the City of Chicago, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of that certain resolution adopted by the City Council of the City of Chicago at a regular meeting held on the ninth (9th) day of December, A.D.1955.

WITNESS MY HAND and the corporate seal of the said City of Chicago this twentieth (20th) day of December, A.D. 1955.

Richard J. Daley, Mayor — John C. Marcin, City Clerk

OPEN DISCUSSION

MULTI-DIAL SIGNAL OPERATION

In the October issue of TRAFFIC ENGINEERING *magazine there appeared an article in the Reference Notes Section entitled, "Easing the Headaches of Multi-Dial Traffic Signal Operation." The following letters discuss this article in greater detail.*

Dear Mr. Hayes:

Your articles appearing in the October 1955 issue of "Traffic Engineering" and the September-October 1955 issue of "Municipal Signal Engineer" on the subject of easing the headaches of multi-dial traffic signal operation, prove most interesting. You have pointed out most of the limitations in running all three dials simultaneously. In addition to avoiding the use of cycles in multiples like 40 and 80, 45 and 90, or 50 and 100, you must realize that the use of combinations such as 60 and 90 second cycles can also get you into trouble! To elaborate further, use of any two or more cycles in any one of the following series can cause faulty operation of the system.

Series A—30, 60, 90, 120 seconds
Series B—35, 70, 105 seconds
Series C—40, 80, 120 seconds
Series D—50, 75, 100 seconds

It should be pointed out that in your proposed system ONLY the dials of the master controller are run continuously. It is assumed that you use a SEPARATE MASTER and that you do not propose this system where a Combined Master and Intersection controller is used. I am sure you realize that if you ran all of the dials in an intersection controller you would encounter long periods of dial and drum resynchronization upon dial transfer. The signal switching unit or drum or cam shaft can only be in step with one of the three timing dials at any given time. Upon dial transfer, the cam unit must be resynchronized with the newly chosen dial. A period of resynchronization insofar as the signals are concerned, may take as long as one cycle, due to the fact that the newly chosen dial is not in step with the dial upon which the signals were being operated.

Usually dial transfer takes place during the first part of the main street green interval with the result that all resynchronization is lumped into the most desirable portion of the cycle, namely, main street green. On arterial streets, this is frequently truly desirable. However, in grid or area systems the "cross streets" are oftentimes just as important as the main street, and hence this scheme fails to prove satisfactory.

Realizing the limitations of applying your proposed system of interrupting the offset circuits, we, in 1947, standardized on the use of a separate offset interrupter dial for each cycle or master dial. This gives the traffic engineer individual adjustable control over the resynchronizing period for each dial or the maximum of flexibility of control of the system's operation.

Although we furnish our offset interrupters with six keys in each dial, my personal opinion is that three or four keys prove quite adequate. Using four keys equidistantly spaced about the interrupter dial means that the resynchronizing period is limited to less than ¼ cycle each cycle. As I believe you know, our offset interrupter dial rotates a few percent faster than the master dial so as to avoid the possibility of improper synchronization of the system with an offset interrupter key.

The maximum number of cycles it takes the system to resynchronize after offset transfer or power interruption is one more cycle than the number of keys in the interrupter dial. However, you must also realize that the system may become resynchronized in less than one cycle. The exact amount of time required will be dependent upon the relationship between the existing offset arrangement and the newly chosen offset.

The chief advantage of your system over the conventional General Electric system occurs upon dial transfer provided you

(1) Use a separate master and
(2) do not operate your system on any of the limiting cycle combinations.

Upon dial transfer, when the master transfers to the newly chosen dial ahead of the intersection controllers, your system avoids the possibility of false resynchronization of the intersection "old" dial with the newly chosen master dial.

A copy of this letter is being sent to Mr. Todd of Traffic Engineering and Mr. Irvin Shulsinger of Municipal Signal Engineer. Undoubtedly they will be very much interested in hearing from either you or Mr. Rawlins relative to my comments. In closing, be assured that we are looking forward to hearing from you on this subject of mutual interest which is so close to our hearts. We extend our best wishes to both you and Mr. Rawlins for continued success and good luck in your traffic signal work.

W. E. SCHWANHAUSSER
Traffic Engineer, Outdoor Lighting Dept., G.E. Co., Hendersonville, N. C.

Dear Mr. Schwanhausser:

We were not surprised to get your letter of November 7, 1955, relative to our article in regard to the problems involved in changing from one dial to another in multi-dial traffic signal operation.

You have pointed out things that will cause either faulty or undesirable operation. We were familiar with these undesirable features and took steps to correct them. The article merely pointed out the fundamentals without all the technical details. It was felt the average technician would come upon these by himself.

To correct your statement about combinations such as 60 and 90 second cycles—and the use of two or more of the following cycles,

"Series A—30, 60, 90, 120 seconds
Series B—35, 70, 105 seconds
Series C—40, 80, 120 seconds
Series D—50, 75, 100 seconds",

60 and 90, 70 and 105, 80 and 120, 90 and 120, 50 and 75, 75 and 100 are not full multiples or 2, 3, 4 etc. times the smaller number but are 1½ multiples and therefore do not cause faulty operation. 1½ multiples match on only every third dial revolution. Therefore, even a slower third cycle

would interrupt the reset and throw the 1½ cycle out of step. The odds against these occurrences are great. Even if it did happen in a rare instance the worst that could happen would be prolonging getting in step by one cycle.

The master-local combination needs some explaining. As you know, the usual procedure is to keep the dial and cam relationship in the artery green by using a false ratchet of the cam during the artery green to get the relationship. In making this adjustment for a minimum artery green there is a better than 50/50 chance of keeping the dial and cam relationship. When this relationship is not maintained the dwell occurs in the artery green. In six months of operation under these conditions we have had very little trouble with this.

Some of the advantages we have found seem to far outweigh the occasional disadvantage. For example, at one end of an interconnected system the volume of traffic requires that we run the controller at this intersection on a 100 second cycle while the rest of the system is on a 70 second cycle. This occurs in the evening and goes to the 100 second cycle at 4 P.M. At 4:55 P.M. the entire system goes to a 100 second cycle. At 5:25 P.M. the system, with the exception of this one intersection, goes back to a 70 second cycle. This intersection continues on a 100 second cycle until 6 P.M. The transfer to the 100 second cycle at the one intersection is done by a time switch on the control box and the 100 second dial is synchronized by interruption, with the master. When the master transfers the rest of the system to the 100 second dial the controller transferred in advance is already in step and the changeover is accomplished very smoothly.

Another example of advantageous operation occurs in the interconnected central business district comprising 21 signalized intersections supervised by a separate master controller. Twenty-two outlying adjacent non-interconnected signalized intersections are coordinated and operated in conjunction with the CBD system. We use multi-dial operation in the CBD which, of course, when using Dial 2 and Dial 3 disrupts the relationship between the CBD system and the adjacent coordinated non-interconnected system. Mondays and Fridays we use Dial 2 and Dial 3 in the afternoon. Tuesdays, Wednesdays and Thursday we use only Dial 3 for one half hour in the afternoon. Saturday mornings we use Dial 3. However, no matter which dial we use or which sequence of dials 2 and 3 we use, when we return to Dial 1 we are always in step with the adjacent system.

A third example involves two one-way streets—six intersections eastbound and five intersections westbound. Also, in this system is one intersection which periodically during the day handles heavy traffic from a GM plant. Here again we interrupt the normal operation at this one intersection to handle heavy volumes dumped into it by the plant. However, when switching back to Dial 1 this intersection is always in step with the rest of the system.

ALLEN T. HAYES
City Taffic Engineer

Lansing, Michigan

Dear Mr. Hayes:

Your last letter has just reached me at our new location in Hendersonville. We certainly appreciate your reply and particularly the explanation of your specific problems. These are all worth publication to those interested or confronted with similar problems.

Hawkins Traffic SAFETI-BAR

A JIGGLE-BAR THAT JIGGLES AND CONTROLS

Concepts evolving from use of jiggle-bars are often misunderstood. Barriers, damaging obstacles and pre-cast curbs which throw vehicles out of control have no engineering factors. A true jiggle-bar CONTROLS, GUIDES. PROTECTS and is a step TOWARD SAFETY. PROTECTING a TRAFFIC SIGN with DEATH is not an Engineering feat.

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There is still one point on which we do not agree. We have found through bitter experience that use of cycle multiples such as 1½ as well as full multiples can get you into trouble.

As an example it is possible for a 90 sec dial to get in step with a 60 sec Master dial when using your proposed system. It must be admitted that this does not always occur and as a matter of fact, may never occur. However it is possible and has caused "false synchronization" and the resulting interruption to traffic.

We realize that a 60 sec dial will not get in step with a 90 sec Master. In other words you need not worry about a secondary dial falsely resynchronizing with a longer master cycle. On the other hand you must recognize that it is possible for a secondary dial to resynchronize with Master Dials operating on shorter cycles including fractional multiples such as 1½ as well as full multiples.

Once again, let me express our thanks here for your continued discussion of this reset problem. We hope you will concur in our analysis of cycle limitation other than full multiples.

Very truly yours,
W. E. SCHWANHAUSSER

Hendersonville, N. C.

Reference Notes

DO ONE-WAY STREETS IMPROVE BUSINESS OR PROPERTY VALUES?

By John T. Hanna (Mem., ITE)
Assistant Director of Public Safety, Richmond, Virginia

Because of continuing congestion on Cary and Main Streets in Richmond, Virginia, in November of 1952 both thoroughfares were made one way from the 1400 block east to the 3300 block west, approximately three miles. The one-way streets originate in the downtown area and extend through the residential district into the West portion of the city. Main Street is north of Cary Street and was designated westbound while Cary Street was designated eastbound. A four-block outlying shopping district exists in the 3400, 3300, 3200, 3100, 3000 and 2900 blocks on Cary Street between the Boulevard and Nansemond Street. Bitter opposition developed due to the 4 P.M. to 6 P.M. peak period westbound flow which was to bypass this shopping district. Fear of depreciated property values and loss of retail sales was the basis of the majority of the complaints.

The following is a statement from the Assessor's office comparing the business experience on West Cary Street from Boulevard to Nansemond Street with Hull Street from Second to Twenty-first Street which is a similar business district but on a two-way street.

TABLE I

Compared Item	3400-2900 Block on Cary Street	Hull Street from 2nd St. to 21st St.
Assessed value—1955	$3,903,690	$4,859,680
Assessed value—1952	$2,664,120	$3,636,920
Assessed value increase	$1,239,570	$1,222,760
Percent increase	46.5%	33.6%
Gross real estate sales 1952-1955	$544,900	$1,001,720

A survey was instituted relative to the volume of business of commercial establishments along West Cary Street between the Boulevard and Nansemond Streets. No business was selected for study where the products being sold were materially altered, the ownerships changed, or the buildings reconstructed or remodeled. Every other business establishment in the area was investigated. The gross receipts for retail sales were selected for each business for the years 1951, 1952, 1953 and 1954 and compared with the city-wide license yield. The license yield refers to a graduated scale of returns for taxing gross retail receipts. However, the established returns in Richmond did not change appreciably during 1951, 1952, 1953 nor 1954.

TABLE II

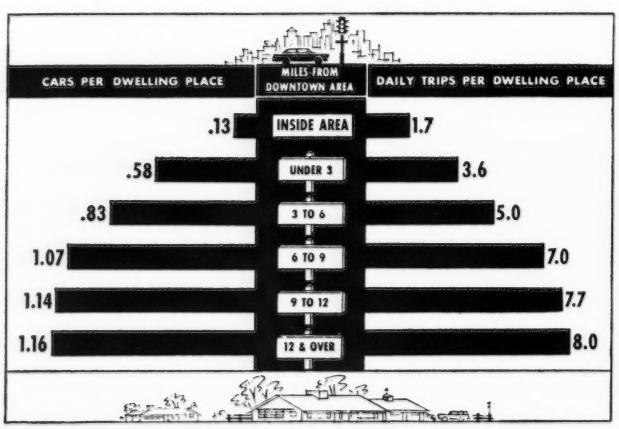
Year	Total Gross Retail Receipts West Cary Street	City-wide License Yield
1951	$7,570,374	$3,099,566
1952	8,279,234 increased 94% over 1951	3,199,808 increased 3% over 1951
1953	9,003,231 increased 8.7% over 1952	3,202,099 increase negligible
1954	9,176,623 increased 1.9% over 1953	Not available

During the four-year period there was a continual and greater increase in business volumes on West Cary Street than prevailed throughout the entire city. Therefore it can be concluded that this one-way street did not reduce gross retail sales and is probably responsible to some degree for an increase over and above those occurring city-wide.

TABLE III

Traffic volumes for an average day.

	1952 Before one-way	1955 After one-way
Ellwood (a continuation of Main St. from 2900 to 3400 block)	3800	7800
Cary Street	8666	8439
Totals	12466	16239



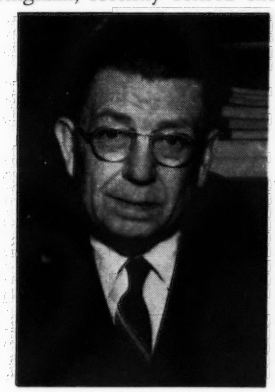
INADEQUATE ROADS COST MOTORISTS MORE THAN $5 BILLION PER YEAR

	INTERSTATE SYSTEM	OTHER ROADS & STREETS
Traffic Accidents	$1.0 BILLION	$700 MILLIONS
Commercial Vehicle Time Losses	$900 MILLIONS	$900 MILLIONS
Losses in Gasoline, Brake, Tire Economy	$700 MILLIONS	$600 MILLIONS
Vehicle Operating Costs on Earth-Gravel Roads Scheduled for Surface Betterments		$500 MILLIONS
TOTALS	$2.6 BILLIONS	$2.7 BILLIONS

TRAFFIC NEWS

Bingham Joins Houston's Monorail Organization

A world-renowned transportation expert has joined Houston's Monorail, Inc., as a consulting engineer. Murel Goodell, president of Monorail, Inc., announced in December that Col. Sidney H. Bingham, recently retired executive



director and general manager of the New York Transit Authority--the nation's largest transportation system--has added his vast technical skill and knowledge to the Houston project.

"With the experience of Colonel Bingham," said Goodell, "we can be assured that our development will be pinpointed toward solving the special problems of mass transportation in a practical manner."

Col. Bingham, recognized as one of the greatest living experts on city transportation problems, accepted the Houston appointment only after careful consideration.

"I have made a cautious analysis of the plans and specifications of the Houston monorail project," he said, "and I want to congratulate the Houston developers on the new thinking they have brought into monorail planning."

Calling attention to the "economy, practicability, ease of construction, and passenger traffic flow of the Houston design," soon to be in test pilot stage at Arrowhead Park here, he stressed particularly the "simplified design which is pleasing to the eye in contrast to the ugly structures of the past."

The Colonel said that prior to the Houston design there has been "no technological improvements in the past 50 years in such proposed developments."

He said he was impressed with the fact that Monorail can be used to "operate overhead with ground level stations or entirely on ground level as well as underground for inter-city or central city operations where overhead structures are not feasible, as in New York, London, Paris, or Stockholm where subways are employed."

A descendant of William Hedley who built the first locomotive, Col. Bingham has been associated with mass transportation since 1915.

He has seen service in two World Wars. During World War II, he held important assignments in planning and directing military railway operations abroad.

He developed designs for specially constructed LST's which helped make the invasion of Normandy possible, and the "Breathing Bridge", a landing device at the beachhead.

One of his wartime assignments was as designer and supervisor of the "Bayonet" the armored train used by General Eisenhower.

Since the war he has been general superintendent of the New York Transit System and is the first Commissioner ever appointed there from the ranks.

He has since been chairman of the Board of Transportation and Executive Director and General Manager of the Transit Authority.

He has been consultant about transportation systems in Paris, London, Norway, Sweden, Australia, and Chile, and has worked out problems for San Francisco, Los Angeles, Pittsburgh, Cleveland, Boston, and other major American Systems.

For his services, he has received honorary degrees from Fordham University, Duquesne University, and Lafayette College, and has been awarded medals from the President of Chile, the government of France, and the King of Sweden.

This year, he was given the Alfred Brahdy Memorial Award by the Society of Municipal Engineers in New York City.

Col. Bingham is the man credited with forecasting and pressing for the development of the "Senicruiser" type-buses, "Talgo" type-trains, automatic railroads, and conveyor belts-all successful new forms of public transportation.

Ohio State To Study Accidents

A broad study of Ohio highway accidents, aimed at determining the basic causes of traffic mishaps, is under way in the Ohio State University Engineering Experiment Station.

A seven-member team representing several university departments will work on the project, sponsored jointly by the Ohio Department of Highway Safety and the University. The detailed investigation will take at least a year, Professor Green said.

Purpose of the study is to provide facts on accidents not always apparent from existing reports. Possible value of such information was stressed Friday by Director U. C. Felty of the Department of Highway Safety, who said that traffic accidents in Ohio alone now cost more than $200 million per year.

"These costs include property damage, wage loss, medical and hospital expenses, and insurance," Mr. Felty said "The additional cost in suffering of 70,000 injuries and 2,000 deaths per year is not measurable."

Supervising the study will be Prof. Emmett H. Karrer of the civil engineering faculty, widely known authority on highway engineering.

"In any accident, there are usually several contributing factors," Professor Karrer said. "The design of the highway, condition of pavement, condition of the vehicle, and that of the driver each may be partly responsible for the accident."

Principle effort of the Ohio State study will be to develop "comprehensive and completely factual" data on the cause of accidents, which often is not available.

Education of drivers through special campaigns such as the national "Safe Driving Day" and "MAPS" in Columbus are unquestionably beneficial in reducing accident tolls, Professor Karrer believes.

He adds, however, that "officials responsible for the operation of our roads and streets are well aware that the basic problems lie far deeper."

The State Department of Highway Safety will provide preliminary information on accidents for the research pro-

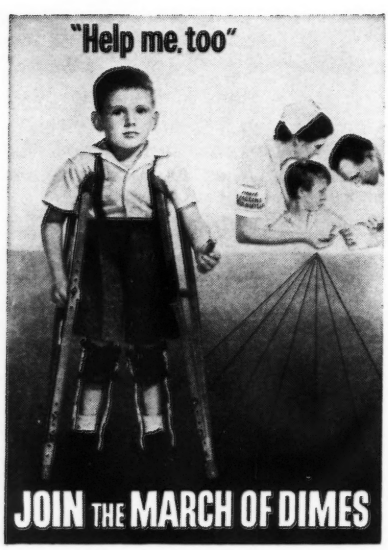
ject. Two graduate students, David M. Glancy and Thomas G. Brittenham, will collect data on specific accidents through interviews of persons involved. Glancy, a student in civil engineering, will analyze physical condition, alignment, grade, curvature and other aspects of the highway. Brittenham, a student in social administration, will analyze patterns of driver behavior.

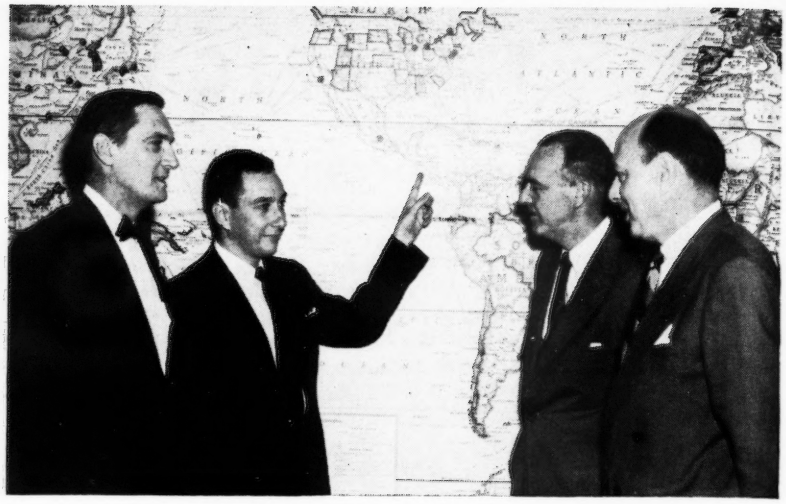
The team for the project also will include four faculty members yet to be named. These will be a professor of mechanical engineering who will deal with mechanical failures in the automobile; a professor of civil engineering, familiar with elements of highway design and condition; a professor of psychology who will assist in matters of driver capability; and a professor of social administration who will be concerned with the problem of driver attitude.

"At first we will limit the study to one-car accidents in rural areas," Professor Karrer said, "in order to eliminate the problem of 'blaming the other driver.'" He added that "there is plenty of material for us in the rural category."

Later, as results of the study warrant, the researchers may take up road and street accidents in other areas and involving more than one car.

Franklin County accidents will be the first studied, but later ones will be selected from other areas to make the research findings representative of the state. Information obtained will be placed on "punch cards" from which statistical data may be obtained as desired.





Braun Confers In Nicaragua

Wallace L. Braun (Mem., ITE), Deputy Director of Vehicles and Traffic in Washington, D. C., visited Managua, Nicaragua, for three weeks last November and December to discuss with their government officials the reorganization of traffic handling procedures. He worked directly with the Mayor and Chief of Police in Managua. Before going to Nicaragua, Mr. Braun met Modesto Armijo, Minister of Development and Public Works of Nicaragua, who is pointing to his country on the map in the photograph above. Francis E. Twiss (extreme left) and Robert O. Swain (extreme right) both of the International Road Federation and members of the Institute, arranged the conference.

Garden State Parkway Connection Planned

The New Jersey Highway Authority moved ahead with plans for linking the Garden State Parkway with the New York State Thruway by 1957.

Following its announced determination to proceed with the approximate 9-mile connection, the Authority has advanced negotiations for temporary financing of the Parkway's feeder road.

The proposed connection would tie together the two major toll facilities at the New York-New Jersey State line. The Authority has set the alignment of the feeder road from the Parkway's present northern terminus at Route 17, Paramus, through upper Bergen County.

Under the alignment, the Parkway would be carried northward from the Paramus terminus through Washington Township, Hillsdale, Woodcliff Lake and Montvale to the State line. The actual meeting point of the Parkway and Thruway at the line is to be determined by their respective engineers.

The link would open up a new avenue for superhighway travel between New England and New York State and the New Jersey shore. The Parkway-Thruway connection would also create an easy by-pass of metropolitan New York City for traffic traveling between New England and New York State, and the Philadelphia-Trenton area and other points South and West.

National Urban Transportation Committee Notes Progress

For many years, the great lack of basic facts concerning urban transportation has been a frustrating barrier to municipal officials seeking an economical solution to critical problems. Now, after a year of intensive study, the National Committee on Urban Transportation has developed practical procedures to eliminate the barrier and clear the way for getting to the heart of these transportation problems.

These procedures, now being incorporated in a manual, actually mark a milestone in the history of automotive transportation. For the first time, the municipal official will have a blueprint to follow in evaluating existing and potential needs for moving persons and goods within an urban area. This outlines what type of basic information should be collected, how this should be done, and how the data should be analyzed.

These procedures represent the best thinking of some 160 of the country's top transportation and municipal experts who are serving on nine sub-committees. Procedures developed will be field-tested through pilot studies in selected cities early in 1956. After this work is completed, the methods will be reviewed and revised in the light of pilot study experience. The manual

then will be made available to all interested governmental agencies, departments and jurisdictions.

City officials have realized for a long time that without a fund of basic information, urban transportation problems simply cannot be adequately defined or measured. Nor can clear statements of needs be presented to legislative bodies or the public. And it follows there can be no sound development of long-range plans for the proper improvement and operation of transportation systems.

There have been attempts to do something about the serious lack of factual data. Some cities have carried out data-collecting programs. The practice has not been widespread, however, chiefly because the subject is so complex and programs have been so costly. As a result of tremendous increases in traffic movement since World War II (and indications of ever-growing volumes in the years ahead), expenditures for urban transportation are rising and undoubtedly will be stepped up even more. This probability becomes even more of a certainty in view of the proposed Federal program. It is imperative that these funds be spent soundly in accordance with well-developed plans based upon fact.

Development of uniform fact getting machinery, adaptable to use by municipalities of all sizes, came with establishment of the National Committee on Urban Transportation in May, 1954. The Committee was formed by six organizations whose interests lie in the urban field—American Municipal Association, American Public Works Association, American Society of Planning Officials, International City Managers' Association, Municipal Finance Officers Association, and the National Institute of Municipal Law Officers.

The National Committee agreed to sponsor a project on a national scale, utilizing the cooperative knowledge and abilities of technicians from all parts of the country. Thus were born the procedures which will show local governments how to carry out fact-gathering programs in an economical and efficient manner, within the normal framework of municipal administration.

These procedures fall generally into three categories: determination of basic transportation requirements, evaluation of transportation facilities, and appraisal of legal, financial and administrative machinery.

They will show how to collect and analyze information about such matters as:

- The number of trips made between certain points
- The hours they occur, and the mode of travel used
- The mileage of arterials and freeways needed
- The justification for express transit service
- The time it takes to get from one point to another by cars, trucks and transit
- The effect of traffic congestion on transit schedules and truck operations
- The capacity of a street system to accommodate various types of vehicles
- The demand for parking and loading facilities
- The need for state enabling legislation and local ordinances in coping with street transportation
- The deficiencies of administrative authority in meeting requirements of planning, financing, constructing and operating transportation facilities in metropolitan areas
- Sources of revenue for transportation programs

These and the hundreds of other basic facts obtained through use of the procedures will aid:

1. *The municipal governing body*—in establishing the policy for the level of transportation services.
2. *The chief administrator*—in determining how transportation improvements can be integrated with other city services.
3. *The city planner*—in developing plans and preparing capital improvement programs.
4. *The traffic engineer*—in operating the street system with maximum efficiency.
5. *The transit operator*—in providing more effective service.
6. *The director of public works and the city engineer*—in designing street improvements and directing the street maintenance program.
7. *The financial official*—in the preparation of annual budgets and financing long-range improvement programs.
8. *The city attorney*—in the drafting of laws and ordinances.

As the work of the National Committee progresses, every effort will be made to increase the benefits of this program to municipal officials. It is hoped all public officials will continue their active interest, support and cooperation for this important national project.

LOOKING AHEAD

FEBRUARY 17-18—WASHINGTON, D. C.
Annual Spring Meeting of National Society of Professional Engineers, Mayflower Hotel.

FEBRUARY 26-29—ST. LOUIS, MISSOURI.
Annual Convention and Exhibit, National Electric Sign Association, Jefferson Hotel.

FEBRUARY 28, 29, and MARCH 1—URBANA, ILLINOIS.
Forty-second Annual Illinois Highway Engineering Conference, University of Illinois.

MARCH 1-2—URBANA, ILLINOIS.
Eighth Annual Illinois Traffic Engineering Conference, University of Illinois.

MARCH 4-6—ATLANTA, GEORGIA.
Southern Safety Conference and Exposition, Biltmore Hotel.

MARCH 12-16—CHICAGO, ILLIONIS.
National Electrical Manufacturers' Association, Edgewater Beach Hotel.

MARCH 18-24—WASHINGTON, D. C.
Consecutive Meetings and Co-Exhibit of the American Congress on Surveying and Mapping and American Society of Photogrammetry, Shoreham Hotel.

MARCH 18-21—PORTLAND, OREGON.
Spring Meeting of The American Society of Mechanical Engineers, Multnomah Hotel.

APRIL 30-MAY 2—WASHINGTON, D. C.
Annual Meeting Chamber of Commerce of the United States.

MAY 17-18—COLUMBIA ,MISSOURI.
Eighth Annual Traffic Engineering Conference, University of Missouri.

SEPTEMBER 17-20—ST. LOUIS, MISSOURI.
Annual Meeting, American Transit Association, Jefferson Hotel.

SEPTEMBER 24-28—SAN FRANCISCO, CALIFORNIA
Annual Meeting of the Institute of Traffic Engineers, Mark Hopkins Hotel.

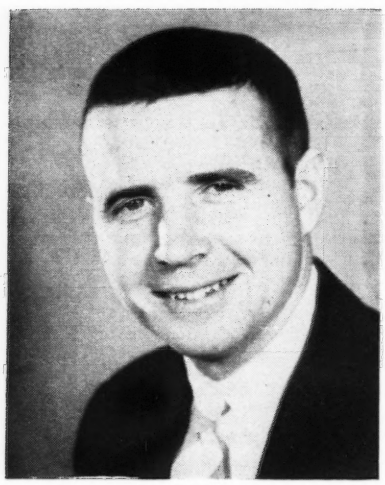
OCTOBER 22-24—NEW YORK, N. Y.
Thirty-eighth Annual Meeting American Standards Association (in conjunction with Seventh National Conference on Standards). Hotel Roosevelt.

OCTOBER 22-26—CHICAGO, ILLINOIS.
Forty-fourth National Safety Congress & Exposition, National Safety Council.

New Appointments . . .

Rankin Moves to Ottawa

Woodrow William Rankin (Assoc. Mem., ITE), assumed his duties as Director of the newly created Department of Traffic Services in Ottawa, Ontario, Canada in late November. The new department reports directly to the Mayor and Board of Control. At the time of his appointment he was Traffic Engineer for Wichita, Kansas, a post he had held since July 1953.



Woodrow William Rankin

Reared in Rochester, New York, where he was born in 1918, he spent four years in the Engineering School of the University of Michigan from which he received his degree in Transportation Engineering in 1941. Following 18 months employment in the U. S. Corps of Engineers' Detroit office, he entered the Armed Services early in 1943 and served in the European Theatre as an Air Force photo interpreter Lieutenant.

After the war and four years of engineering in the coal fields of West Virginia he enrolled in the Yale Bureau of Highway Traffic to earn his Certificate in June 1951, following which he accepted employment with Wichita as Assistant Traffic Engineer.

"Woody" Rankin has been very active in Institute affairs having served as Secretary-Treasurer of the Missouri Valley Section from 1953 to 1955 and as Treasurer of the 1954 Annual Meeting of the Institute.

He is married and has three children, ages 3 to 8. His outside interest is "once a week duffer" variety golf with the hope of some day breaking 90. In Ottawa he hopes to revive an earlier interest in winter sports.

Berry Accepts Professorship at Purdue

Donald S. Berry (Mem., ITE), formerly Professor of Transportation Engineering at the University of California, Berkeley, has joined the faculty at Purdue University as Professor of Transportation Engineering, effective January 16, 1956. At Purdue, he will coordinate the academic programs at graduate and undergraduate levels in the field of transportation engineering, as well as teach graduate work in traffic engineering, highway economics, and related phases of transportation engineering. He will also work with the many graduate students employed in the Joint Highway Research Project, in the planning of their programs of graduate study in highway and transportation engineering.

Donald S. Berry

Dr. Berry is transferring to Purdue from a similar position at the University of California in Berkeley, where for the past seven years he has been teaching traffic engineering. In addition to being Professor of Transportation Engineering at the University of California, he has served as Assistant Director, Institute of Transportation and Traffic Engineering and Chairman, Division of Transportation Engineering. Prior to 1948, he served 12 years with the National Safety Council where he was Director, Traffic and Transportation Division. Prior to 1936, he had worked with highway departments in Michigan and South Dakota.

He received a Ph.D. in Civil Engineering-Transportation from the University of Michigan in 1936, and an M.S. in Highway Engineering from Iowa State College in 1933. He is a member of ASCE, ASEE, the Highway Research Board, and Sigma Xi, Sigma Tau, and Phi Kappa Phi. He has been a member of the Institute of Traffic Engineers since 1937, and has served as Vice-President, Midwest Section, and President, Western Section. He currently is Head, Department of Professional Standards and Education of the ITE, and a member of the ITE Technical Council. Dr. Berry is a Registered Professional Engineer in Michigan.

He has been active on many committees of the Highway Research Board, and is also a member of the National Committee on Uniform Traffic Laws and Ordinances, and a member of the National Joint Committee on Uniform Traffic Control Devices. He is Chairman, Speed Committee, National Safety Council, and is active in the work of the National Committee on Urban Transportation.

Dr. Berry is married and has two daughters, ages 15 and 10.

Single - Sized License Plates By 1957

A twelve-by-six-inch license plate will appear on all vehicles in the North American continent by 1957 according to the American Association of Motor Vehicle Administrators. In addition to the 65 North American jurisdictions who have approved the standard-sized license plates by 1957, Mexico and Puerto Rico are also planning to use the same size plates.

When You Change Your Address

. . . please notify us promptly. Your copies of **"Traffic Engineering"** will then reach you without delay and without interruption.—Traffic Engineering Magazine, Strathcona Hall, New Haven 11, Connecticut.

Strictly Business

Rubber Guard Posts

When an irresistible force meets an immovable object—something is bound to happen.

In the case of suburban Cuyahoga Falls the irresistible force too often was the car of an unwary motorist travelling west on the city's Broad Boulevard meeting head on with the steel guard posts protecting the center strip at the intersection of Seventh Street.

Following a series of accidents over a period of 10 years in which several motorists were killed and extensive property damage incurred the city council moved to eliminate the traffic hazard.

Upon the recommendation of city council, the rigid steel posts were removed in January of 1953 and replaced by rubber posts designed by the Goodyear Tire & Rubber Company.

The test installation was originated by engineer M. C. McCoy, Goodyear tank lining department, under the direction of the late R. W. Eckstein, then manager of that department.

Made of very high tensile compound, the rubber posts are similar in design and construction to the Goodyear-built rubber dock fenders installed in New York harbor to protect both ship and pier and to aid in docking the high-speed liner, United States.

In the traffic guard post project, the hollow tubes are cut to five-foot lengths which slip over 18-inch long steel tubes imbedded in a concrete base. The steel core extends only a few inches above ground, so that the rubber tubing absorbs the full impact in case of a car or truck collision.

"In designing the posts," said McCoy, "we followed the principle" 'it isn't the fall that kills you, it is the sudden stop.' In this case the "fall" is lateral motion of the moving car. We are convinced that the posts will prove sufficiently strong to withstand the impact of the vehicle, yet flexible enough to give under the shock and thus prevent serious injury to the driver."

This statement was made at the time of the test installation in 1953. The results seem to bear out Mr. McCoy's contention.

Since the tests began in January of last year, no fatalities have occurred at the heretofore dangerous intersection.

Duncan Developes New Meter

The Duncan Parking Meter Corporation, continuing its record of many "firsts" in the parking meter industry, proudly announces its newly developed Duncan-Duplex parking meters. A new concept of two meters on one pipe standard, the Duncan-Duplex highlights an ingenious, exclusive Duncan feature (pat. pending), in the multi-positioning of the individual meter heads. This flexible facility of meter head facing has been designed and developed specifically to eliminate all current motorist confusion and loss of good will prevalent where ordinary twin meters are used.

Each meter head is capable of being faced in one of three directions, with a simple adjustment the only requirement necessary to face a meter head to a new directional position. Duplex flexibility provides assurance to the motorist and enforcement officer alike that the parking meter appropriate to a particular parking stall is the meter facing it.

The advantages of Duplex flexibility are many, but one of the most pronounced advantage to this equipment lies in the important fact that the meter mechanism *is not* a new, untested, unproven mechanical device in search of experience. Instead it is the same rugged, precision Duncan-Miller Model 60 mechanism, the result of over eighteen years of parking meter manufacture and experience. Consequently Duplex mechanisms are completely interchangeable, either by unit or by part with any single Duncan-Miller Model 60 meter, used in conjunction with the Duplex system. Maximum standardization is easily attained with a Model 60 and Duplex installation.

An additional advantage, especially appreciated by service personnel in all Model 60 installations is the five second "lift-out" mechanism. This feature provides easy, immediate access to the complete mechanism unit for quick servicing. Inclement weather presents no servicing problem, in that a complete exchange of mechanisms can be easily accomplished in seconds. The resultant savings in service time is another "built-in" Duncan bonus. Of course all Duplex mechanisms retain the tremendous range of coin combination and time limits, plus all of the advantages of Duncan-Miller's flexibility and convertibility.

The Duncan-Duplex, like the Duncan-Miller Model 50 and 60, the Duncan-Automaton and Duncan-Fine-O-Meter is a product of Duncan's perpetual engineering development program. By paying careful attention to reports from servicemen in the field and borrowing on long experience in parking meter manufacture, Duncan has consistently provided the industry with a series of "Firsts" in a never ending attempt to further improve the high quality and efficiency of fine products, as evidenced by the following:

First—Multiple coin meter

First—Combination penny, nickel meter

First—One to fifteen penny meter

First—Meter to take a dime in combination with pennies and nickels or nickels and quarters

First—Fully accumulative meter

First—To perfect wipe-off time

First—To feature visible trouble flag

First—To feature a slot closer (coin gate block)

First—to develop a multi-positioning head unit

Since the manufacture of parking meters is its only business, Duncan Parking Meter Corporation, located at 835 North Wood Street, Chicago 22, is dedicated to the production and sale of quality equipment and toward providing valued customers the highest type of service possible.

New Dimension to Photography

For years cameras have been used from a fixed base to record action as it passed by the camera. Now Jewett Manufacturing Company of San Gabriel, California, have come forward with the

long-sought equipment to put cameras in action, to photograph subjects also in action, or standing still.

The primary unit offered by Jewett is the Triangle J Autopod, a vibration damping base for either a still camera or a motion picture camera, mounted inside an automobile or truck and supporting the camera so that it can be aimed and can shoot pictures through the windshield. The Autopod is strong enough to support any type of camera weighing less than 25 pounds without auxiliary bracing. It attaches to the instrument panel by means of clamps and requires no drilling or cutting.

Outstanding feature of the Autopod is that camera, pan-head and adjustable elevating post can be removed from the automobile fixture by loosening one knurled nut and the whole camera and control unit transferred to the base section of a Tiltall professional tripod (or to any other substantial professional model of tripod by means of an adapter tube screwed into the camera locking nut on the tripod). The photographic unit need not be attached to a tripod to be used but may be hand held and operated with the "tommy gun" action afforded by the shoulder grip of the aiming lever and the hand grip of the elevating post.

The Triangle J Autopod is now in wide use by many industries to photograph action from a moving car heretofore found difficult to take because of the car vibration and motion. Examples of uses are: automobile races and economy runs, automobile testing; tire performance on various roads; traffic control, traffic violations, police evidence of unsafe conditions, safety drives, publicity; television scenes; billboard visibility, record and traffic volume; governmental crop surveys, pest control, smog control, forest fires and flood control records; construction progress pictures, planning and study films; public utility line records and surveys; aircraft landing and takeoff studies, rocket and rocket-sled performance from paralleling cars; military vehicle performance and tests, maneuvers and tank tactics filmed in motion; newspaper and magazine news pictures and films; travel and exploitation pictures, tours and parade shots.

The Jewett Manufacturing Company produces auxiliary equipment for the Autopod such as a power unit for adapting the car battery system to camera operation and remote control fixtures whereby the car driver can operate the camera without being behind the same. They also produce companion camera supports for light planes called Aeropods. Address is Jewett Manufacturing Company, 201 Del Mar Place, San Gabriel, California.

Flashing Flare Beacon Available

The new Flashing Flare Beacon, Model No. 108-F, which retails for only $5.95, less battery, is the latest addition to the BIG BEAM line of electric hand lamps, flares, and automatic emergency lights produced by U-C Lite Manufacturing Company, 1050 West Hubbard St., Chicago 22, Illinois.

This new Flare features a flashing bulb covered with a red Fresnel lens of durable molded plastic. A simple push-button switch starts and stops the light. The Flare is powered by one standard 6-volt lantern battery housed in a sturdy, waterproof steel case finished in red enamel. Battery replacement can be made in a few seconds as there are no wires to connect. Lamp to battery contact is pressure type. Fresnel lenses are also available in blue, green, amber, and clear.

Designed for emergency use by motorists, sportsmen, truckers, contractors, highway and plant protection, police and fire departments—the flare also has many other uses. A typical application is during an emergency stop of an automobile in the dark of night. The motorist simply places the BIG BEAM Fashing Flare on top of the car or on the road near the car, to flash a warning signal to other drivers. When not in use, this company unit will fit neatly into the glove compartment of a car, a fishing tackle box or the tool kit of a truck.

Fluorescent Luminaire Introduced

Plastic materials have been adopted by the Westinghouse Electric Corporation to provide ultra-modern styling and maintenance and operational efficiency for its newly introduced fluorescent luminaire for street and roadway lighting.

Canopy housing for the luminaire is of rugged, lightweight Fiberglas-reinforced plastic. Since the color is inherent in the plastic, repainting is not required in maintenance. The material also does not absorb moisture and is resistant to corrosion.

The cover of the luminaire is of extruded methylmethacrylate plastic which does not craze or discolor with age. Center section of the cover is clear and the end sections are translucent. A gasket of sponge neoprene provides a pressure seal against entrance of bugs, dirt or water.

Two aluminum reflectors are designed to provide maximum candlepower and minimum trapping of light from four 72-inch fluorescent tubes, which have an average life of 7500 hours and characteristics such that illumination does not fall off with decreasing ambient temperatures.

Cover unlatches and swings down from either side for easy maintenance and the luminaire can be mounted either horizontally or at a tilt between 20 and 30 degrees.

Uniform pavement brightness is assured by the broad light pattern and sharpened silhouettes are visible from a greater distance.

Westinghouse points out that the lighting quality of the luminaire plus its attractive appearance make it particularly well suited for business streets where superior visibility for pedestrians and motorists is combined with lighting the exterior of retail establishments.

Self-Propelled Line Marker

A completely new model, self-propelled line marker, featuring either solid or intermittent lines and automotive steering, has been announced by the M-B Corporation of New Holstein, Wisconsin.

The new M-B LineMaster incorporates a number of features that have previously been found only in larger, higher priced models. Among these features is automotive type steering, which makes the ruggedly constructed, three-wheeled LineMaster extremely maneuverable and eliminates the necessity of skid-steering for a perfect curve.

It is one-man operated and travels at a speed of from three to five miles per hour. A sturdy riding platform is provided where the operator is always in line with the paint guns and stripes to make retracing easier.

The LineMaster is equipped with an 18-gallon paint tank with a full opening top, designed for cutting cleanup time. Paint guns are standard, air operated and easily visible to the operator while marking.

The 18-gallon paint tank gives the M-B LineMaster 50 percent greater paint capacity than comparable machines. There is ample power and air reserve for continuous double line work, marking lines from three to six inches wide, regular or reflective, solid or intermittent.

The extreme simplicity of its design makes the LineMaster simpler to operate and service. Not cluttered with unimportant and unused equipment, the M-B LineMaster is a compact unit, yet incorporates many features formerly found only in larger models. It has been specifically engineered for "Big Machine" performance at a competitive price.

Positions Available

H. K. FERGUSON COMPANY CLEVELAND, OHIO

ASSISTANT TRAFFIC ENGINEER

REQUIREMENTS: Graduate Engineer with a minimum of three years traffic engineering experience with at least one year in parking surveys and reports. Must be willing to travel to cities in the U. S. and Canada.

SALARY: $6000 to $7000 annually dependent upon age and qualifications.

Write:
Eugene A. Barton
Senior Traffic Engineer
The H. K. Ferguson Co.
Ferguson Bldg.
Cleveland 14, Ohio

CITY OF COLORADO SPRINGS COLORADO

PLANNING AND TRAFFIC ENGINEER

to organize and supervise an overall planning program and a traffic planning program.

REQUIREMENTS: Equivalent of graduation from a college of recognized standing with four years' experience in city planning including one year as a principal planner, one year of general administrative experience, and one year as an analyst in traffic engineering.

SALARY: $5460 to $6516 per year.

Apply:
Personnel Director
City Hall
Colorado Springs, Colorado

THE PORT OF NEW YORK AUTHORITY

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For established Traffic Engineering Division to do General Traffic Engineering and studies involving diverse vehicular situations at bridges, tunnels, airports, and truck and marine terminals.

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Submit outline of education and experience to:

Eugene V. Avery
City Traffic Engineer
274 City Hall
St. Paul 2, Minnesota

HENRY GOES RUSH HOUR

By Eric S. Wiley (Jun. Mem., ITE)
Traffic Coordinator, Windsor, Ontario, Canada

The July 1955 issue of TRAFFIC ENGINEERING *announced a contest for our traffic engineer authors. Mr. Bryan Wilson, creator of the fictional series of "Henry Glausson" adventures, agreed to donate a cash prize of $10.00 to the writer submitting the best Henry Glausson episode.*

During the Annual Meeting in Pittsburgh the judges announced that the successful author was Mr. Eric S. Wiley for the episode printed herewith. Mr. Wiley turned his cash award over to the Crippled Children's Fund of Windsor.

It was a hot humid day in June. Henry Glausson, Traffic Engineer of the City of Mule's Head, population 73,000, had just returned from a three-weeks' vacation, feeling well rested, and being with his beautiful secretary again.

With not a worry in the world, he began to review his proposals of the past few months, which he had unfolded to his superiors, a pipe dream which involved a series of rush hour parking restrictions in the central business district of his beloved city. Of course Henry, being wise in the way of approach, designed these restrictions on factual study and analysis.

With little fanfare or to do, Henry's folly, pardon Henry's system, was installed by his efficient and meticulous sign crew. In a matter of two or three days, telephone calls came pouring in from the motorists praising his system. "Why, it only took 10 minutes to get home from work today, and it usually takes me 30 minutes," exclaimed a delighted admirer.

This kept up for a period of almost four weeks, and our friend Henry was basking in the glory of his achievements. To further check the workability of his plan, Henry conscientiously rode and rerode his now famous rush hour routes, and was thoroughly self-satisfied with his accomplishments.

Then one hot, humid day in July, Mr. Henry Glausson, Traffic Engineer, was informed by his beautiful and efficient secretary, that a Mr. Otto Noitall wished to converse with him via telephone.

"Mr. Glausson, this is Otto Noitall, how are you this morning, sir?" "I am fine, and yourself?" inquired our Henry. "The reason I am calling, Mr. Glausson, is to invite you to a little get-together at the request of some of the downtown business associates, preferably tomorrow afternoon."

It was then that our boy Henry took hold of himself and in his usual cautious manner accepted the invitation somewhat hesitantly.

Upon hanging up the telephone, he set his efficient secretary to work. "Miss Willis," Henry addressed her, "I want you to go through the files and compile a report having to do with our cordon studies, our on peak and off peak volume studies, and while you are at it, you might also pull out our delay studies, I must of necessity be well girded for the ensuing battle which appears most imminent.

Came the day; Henry, loaded with files, diagrams, maps and the like, cast a fond look at his adorable secretary, left his office, and started on his way, light of heart.

As he approached his destination, something within him cautioned Henry that this was not going to be any bed of roses. Upon entering the meeting place, he was met by the now not so jovial Mr. Noitall. "Mr. Glausson, will you sit here, please?" Henry thanked him and took his place at a long, hard, cold board table.

It was then and only then that our boy Henry realized that he had become a Daniel. As he gazed around the table, he saw the butcher, the baker, the clothier, the shoe merchant, and the purveyor of sundry items.

A short rap of the gavel brought the solemn mumbling to order. "Mr. Glausson, I would like to introduce you to, from left to right, some of the members of our merchants' association," stated our stalwart and upright citizen Mr. Noitall, "and the purpose of our meeting is to discuss with you these rush hour routes as you call them. I wonder, Mr. Glausson, if you could describe the history of such things, and your reasons for attempting them in our fair city."

"I would be pleased to, sir," replied Mr. Glausson, Traffic Engineer. Henry, still his cautious self, knew that he must delve deeper than a few weeks ago to describe his rush hour routes to what now appeared to be his board of inquiry.

With his maps, charts, graphs, statistical information spread out before him, he went into the history of their fair city as far back as 30 years ago. He described the automotive registration at that time, the physical pattern of the streets and roadways and their capacities. He further described the increase in business areas, the lack of foresight in planning. In summation he gave a statistical presentation of the increase in traffic volumes, the lack of proper lane widths, the present traffic demands, and the ultimate goal in relieving the aforementioned situation.

He gave them all the information available to him concerning before and after volume studies, the speed-up in traffic, and the acceptance by the public. Up until this point, Henry felt quite proud of himself, and felt he was giving a true and accurate picture of the situation as it presently stood.

At the conclusion of his statistical presentation, our traffic genius made his fatal mistake. "Mr. Chairman," he addressed the meeting, "I have given you all the facts at my command, and I am now prepared to answer any questions which might arise." The butcher, the baker, the clothier, the shoe merchant, and the purveyor of sundry items, all bellowed at once. "Mr. Chairman, I have a question." "Just one at a time," cautioned Mr. Noitall. "Now you, Mr. Smith, I believe you won the hands up race." It was then that it started.

Fast and thick they came. "Have you anticipated, Mr. Traffic Engineer, business trends dealing with losses? Have you at all considered the little fellow, who, after a hard day's work in the factory, would like to stop for a five-minute refresher, five minutes only, mind you? Have you considered the drastic reduction in business, the small retail outlet because of your conclusions that might have to close its doors?"

It being a still hot and humid afternoon, our Mr. Glausson, Traffic Engineer, soon wilted under the attack. He countered with the studies of through traffic as against the motorist who wished to stop. But his statistics were badly beaten down, as he was himself.

At the end of three hours of gruelling, and torturous questioning, Henry was a dejected and forlorn figure as he wended his way doorward. With his maps tucked under his weary arm, he started the long trek towards home.

A mile or so from home, poor Henry suddenly felt a drop of rain beat

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against his face. As he trudged along, the torrents gave vent to their feelings, and thoroughly drenched poor Henry and his valuable maps. Henry did not mind too much though realizing that it had been a hot, humid day, and that he would soon enjoy some relaxation and shelve his problems for a few hours.

Arriving home, he dropped his reports, and very dejectedly sat in his favorite chair, oblivious of the fact that he was still in his very wet clothes. Henry sorely needed consolation in his abject loneliness and his thoughts wandered to his ardent secretary, and the wonderful life they could have as husband and wife, but alas, this was not to be.

In this state of mind, poor Henry dozed off into deep slumber, his mind far from the problems of a Traffic Engineer.

In the early hours of the following morning, Henry awoke with a violent sneezing spell, and realized quite foolishly, that he was still in his everyday garb. Very disgustedly he thought of the events of the past few months, hadn't he set the wheels in motion to further ease traffic congestion? wasn't he doing his job as Traffic Engineer? hadn't he received full support from his superiors? then why, why, WHY, should I be subjected to so many rebuttals from merchants who don't realize the immense volume of impending traffic of the future?

The once cautious Henry was a changed man, he knew the responsibility of his position, he knew he must have foresight for the future, he also knew that he must sell his ideas to the public.

With this in mind he hurriedly changed into his night attire, took a hot drink, and with a kindly thought for his efficient secretary he retired for the remainder of the night, in a happy frame of mind.

Arising at his usual time, Henry Glausson, Traffic Engineer, prepared for his daily sojourn at the office.

As he arrived at his destination, he was greeted with a cheery good morning from his secretary.

"Miss Willis," said Henry, "will you please arrange a meeting with Mr. Noitall for this afternoon, and also request him to have the same members present as were there yesterday, at the same time and the same place, you might also return these maps and reports to their respective files, I will not need them today for the purpose which I have in mind."

Later Miss Willis informed our Henry that the meeting was arranged, but oddly enough Mr. Noitall had had the same thing in mind.

At the appointed hour, Henry Glausson sauntered off in a jocular mood, he thought this was his opportunity, he was not going to be a Daniel, he was going to be a salesman.

He was met by the NOW jovial Mr. Noitall, "Mr. Glausson, will you sit here please? and if you don't mind, I would like to sit on your right." Henry looked around and saw them all, the butcher, the baker, the clothier, the shoe merchant, and the purveyor of sundry items, he felt very calm and noticed that there was quite a different atmosphere in the room. There was no gavel, no authoritative voices, and there seemed to be a manifested interest in what was about to happen.

"Gentlemen," said Mr. Noitall, "we are here for one purpose, and I am happy to present to you our guest of yesterday, Mr. Henry Glausson, Traffic Engineer, of our City of Mule's Head. Strangely it appears, that Mr. Glausson requested this meeting, as we did, and I sincerely think that we can have a mutual understanding," said the self-appointed chairman. "At this time," said Mr. Noitall, "I would like to state that after considering the problems of our meeting yesterday, I am inclined to agree with the ideas of our Traffic Engineer, I see now that I myself have taken advantage of the rush hour routes for quite some weeks, and also realized that I have been getting to work earlier, and arriving home earlier, yet it took a meeting, as we had yesterday to make me realize it."

"I have noticed that, too," said the butcher; "me too," said the baker; "me too," said the shoe merchant; "me too," said the clothier; "and me too," said the purveyor of sundry items.

There was no need for Henry to explain why HE had requested the meeting, and he informed the assembly in that respect, he further emphasized his remarks of yesterday, and explained that the cooperation of all citizens was needed to cope with the increasing traffic population.

Henry thanked the listening audience for their indulgence, and felt that this was a bed of roses, the kind words spoken were a just reward.

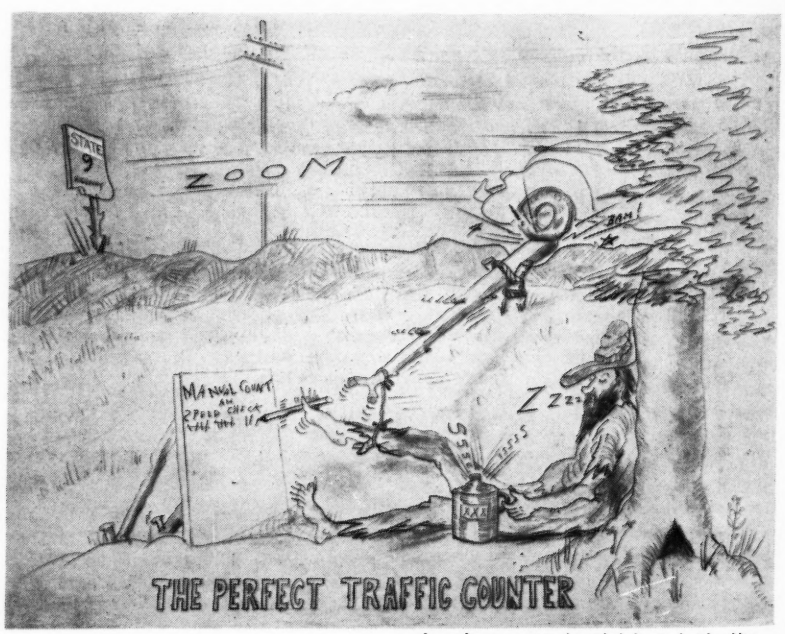
After friendly parting greetings, Henry headed for his office, jubilant in the fact that his ideas had sold themselves. It started to rain again, but the sun shone its dulled rays on our Henry, and was only surpassed, when he received the radiant smile from his beautiful efficient secretary.

Why Wilbur!

The following item was clipped from a Wilmington, N. C., newspaper:

'BURGER LOVER EATS BULBS

Cynthiana, Ky.—(UP)—Wilbur Smith likes hamburgers, but he'll be more careful in the future when he reaches for the onions. Smith was finishing up a midnight snack of hamburgers when his wife informed him the "onions" he had used were narcissus bulbs.



by unknown artist, furnished by Jack Chambliss

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Does the policy pay? Here's proof. In a downtown area, as part of a well planned program, old-style upright standards were replaced recently by 687 trim Monotube poles with modern upsweep brackets mounting 20,000 lumen mercury vapor units. This gave more uniform light, *five and one-half times brighter*, and in one year night accidents were reduced 34 per cent! In this one area the annual accident cost saving is estimated at $38,627— *in accidents that didn't happen!*

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1906 *Fiftieth Anniversary* 1956

UNION METAL

Monotube Lighting Poles

Whose Career?

Each month from the campus of Purdue University, Professor Petty, known as "Ben" by his many friends, publishes a highway extension newsletter. In his August newsletter there appeared an article "Whose Career?" which is reprinted below.

Next to an education itself, one of the most valuable assets a young man can acquire is a "suitable" wife who will gladly and willingly go with him to live **wherever** duty and joy opportunity call.

A wife can largely make or break a man's career. Far too many opportunities are lost and careers blighted by possessive and domineering wives who insist that their husbands accept **only** jobs which will permit them to live in the home-town with mother, or where they can be near Aunt Minnie!

Sometimes it is a "dictated" state, city, climate or other similar specification that limits the lads' opportunities. Or it may be a particular company or the highest **starting** salary on which **her** decision is based.

I have watched it happen many times during the generation I have been handling placement for our C.E. graduates and alumni. Each semester I talk to the senior C.E.'s, graduating in January and June, about job interviews, personality traits, future possibilities in various fields, and employment and career possibilities in general. I frequently advise the unmarried boys to worm out of their prospective brides the biblical statement by Ruth, "Where thou goest, I will go, and where thou dwellest, I will dwell," **before** they pop the question. It is then too late for the others already married.

Of course, wives should be consulted on employment possibilities and future changes, but there should be a mutual agreement that career opportunities supersede home-times and such.

Newborn Signs Bigger

For some time now Sacramento's traffic engineer, D. Jackson Faustman, (Mem. ITE) has maintained that there was no need for larger signs pointing the way to Sutter Maternity Hospital. But the Traffic Engineer has to admit that when he became a prospective father, the bootie was on the other foot. After the excitement of his race with the stork, Faustman confessed that he had missed the signs and had difficulty in finding the streets leading to the hospital. The result: there will be larger directional signs installed along the route.

Engineering News-Record

Sustaining Organizations

A'G'A Division of Elastic Stop Nut Corporation of America
1027 Newark Avenue — Elizabeth 3, New Jersey
Attention: Mr. Irving J. Mack
Sustaining Organization Representative

American Transit Association
292 Madison Avenue — New York 17, New York
Attention: Mr. George W. Anderson
Sustaining Organization Representative

Automatic Signal Division, Eastern Industries, Inc.
Regent Street — East Norwalk, Connecticut
Attention: Mr. Paul L. Green
Sustaining Organization Representative

California Metal Enameling Company
6904 East Slauson Avenue — Los Angeles 22, California
Attention: Mr. Stadish K. Penton
Sustaining Organization Representative

Crouse-Hinds Company
Wolf & Seventh North Street — Syracuse, New York
Attention: Mr. Kenneth W. Mackall
Sustaining Organization Representative

General Electric Company
920 Western Avenue — Lynn, Massachusetts
Attention: Mr. D. T. Carter
Sustaining Organization Representative

The Grote Manufacturing Company, Inc.
Bellevue — Kentucky
Attention: Mr. W. E. Miles
Sustaining Organization Representative

Hawkins-Hawkins Company, Inc.
1255 East Shore Highway — Berkeley 10, California
Attention: Mr. Norman L. Hawkins, Jr.
Sustaining Organization Representative

Lyle Signs, Inc.
2720 University Avenue, S.E. — Minneapolis, Minnesota
Attention: Mr. R. H. Bjorklund
Sustaining Organization Representative

Magee-Hale Park-O-Meter Company
Commerce Exchange Building — Oklahoma City 2, Oklahoma
Attention: Mr. G. A. Hale
Sustaining Organization Representative

The Marbelite Company, Inc.
27 Warren Street — New York 7, New York
Attention: Mr. William E. Lenz
Sustaining Organization Representative

Minnesota Mining & Manufacturing Company
900 Fauquier Avenue — St. Paul 6, Minnesota
Attention: Mr. Donald O. Opstad
Sustaining Organization Representative

Miro-Flex Company, Inc.
1824 East Second Street — Wichita, Kansas
Attention: Mr. H. N. Carver
Sustaining Organization Representative

Portable Traffic Signals, Inc.
146 West 21st Street — Los Angeles 7, California
Attention: Mr. W. W. Taylor
Sustaining Organization Representative

Prismo Safety Corporation
Huntington — Pennsylvania
Attention: Mr. John C. Horn
Sustaining Organization Representative

(Continued on page 229)

Let's face it . .

one way or another .

One

PARKING

VERTICAL---
HORIZONTAL---
ANGULAR---
TWO-WAY---
ONE-WAY---
DOUBLE---

Two

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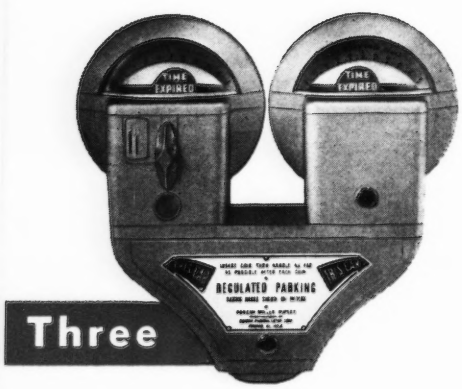
Let's face it . . . . . from every perspective . . . . . DUPLEX versatility will simplify your objective.



Three

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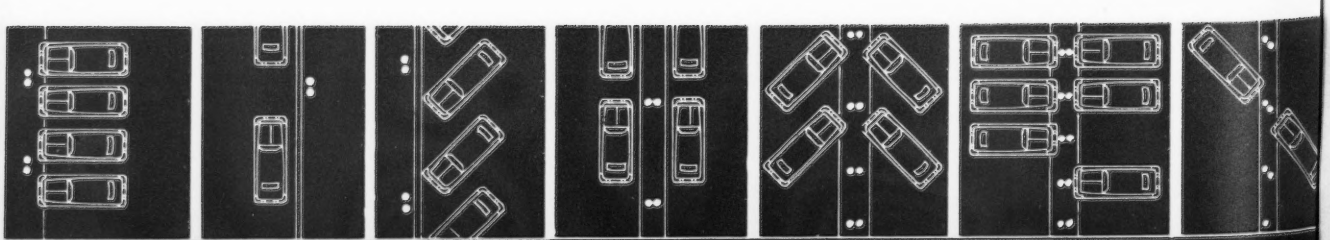
Manufacturers of fully automatic and manual parking meters.



ITE SUSTAINING ORGANIZATIONS

(Continued from page 226)

Revere Corporation of America
Wallingford Connecticut
Attention: Mr. Walter K. Davies
Sustaining Organization Representative

The Streeter-Amet Company
4101 North Ravenswood Avenue Chicago 13, Illinois
Attention: Mr. George F. Graham
Sustaining Organization Representative

Traffic and Street Sign Company
84 Foundry Street Newark 5, New Jersey
Attention: Mr. Walter M. Schoenfeldt
Sustaining Organization Representative

Tuthill Spring Company
760 Polk Street Chicago 7, Illinois
Attention: Mr. H. T. Moore
Sustaining Organization Representative

Union Metal Manufacturing Company
1432 Maple Avenue, N.E. Canton 5, Ohio
Attention: Mr. W. A. Porterfield
Sustaining Organization Representative

U. S. Porcelain Enamel Company
4635 East 52nd Drive Los Angeles 22, California
Attention: Mr. J. L. Hodgkinson
Sustaining Organization Representative

Wald Industries, Inc.
301 Penn Street Huntingdon, Pennsylvania
Attention: Mr. John R. Wald, Jr.
Sustaining Organization Representative

SECTION NEWS

CANADIAN SECTION

Clipped from Canadian Newsletter, **Grant Bacchus,** Editor.

A dinner meeting was held the evening of November 30 at the Saphire Restaurant in downtown Toronto and attended by 33 members and interested persons. Despite the inclement weather, representatives from Hamilton and London travelled to Toronto for this meeting as well as a guest from Calgary, but our friends in Buffalo were "snowed in" and could not attend. After an enjoyable meal the business portion of the meeting got under way at 7:30 p.m. under the chairmanship of **P. E. Wade.**

The minutes of the Canadian Section Annual meeting at Pittsburgh were read, a report on the Ted Matson Fund was presented by **R. B. Campbell,** and a report on the newsletter and membership campaign presented by **G. A. Bacchus.** The recently elected executive was announced and the letter to the Association of Professional Engineers read. Ed Horton introduced his guest, **Phil Wilson** from Calgary who brought greetings from the West. **Phil Wade** made some brief comments about his meeting with the C.G.R.A. committee on the classification of roads.

Bob Burton addressed the meeting with a report of the I.T.E. Convention and gave a very good run-down on all the activities both social and business. He made further comments on the summary statement of the work conference held on "An Evaluation of the Traffic Problem and Its Future". **Bob's** report was appreciated very much by those of us who could not attend the convention.

John Walker then led a very interesting panel discussion on the Parking Situation in Toronto. Among those taking part were **Norman D. Wilson, Art Lomax, Ray Desjardins, Frank Gillies, Bob Burton, Walter Macnee** and **Ken Siddall.** It seemed the concensus of opinion that the only final answer to the ever-growing parking problem was the increased use of public transportation. **Norman Wilson** drew on his extensive experience in both North and South America to give the meeting examples of public transportation and its benefits. **Ken Siddall** brought up the suggestion that if, by a series of service roads, commercial and residential lots could be "backed-up" to main thoroughfares then the parking problem might be partially solved. **John Walker** summed up the discussion and mentioned the progress already made by the Parking Authority.

Ken Siddall was asked to chair a panel discussion on Controlling Access at the next meeting which will be on the last Wednesday of January 1956. Further meetings are also planned for the last Wednesdays of March and May, 1956.

MICHIGAN SECTION

Michigan Section, ITE, held a meeting November 9, 1955, at the 40 & 8 Clubhouse in Lansing. State Highway **Commissioner Charles M. Ziegler, Mr. Robert Schmal,** National Safety Council, and about sixty members and guests attended the meeting.

After a state highway staff home-cooked dinner, **President Gervais** called the meeting to order and a self-introduction of those present was called for. The "KP" squad got a warm reception for a job well done.

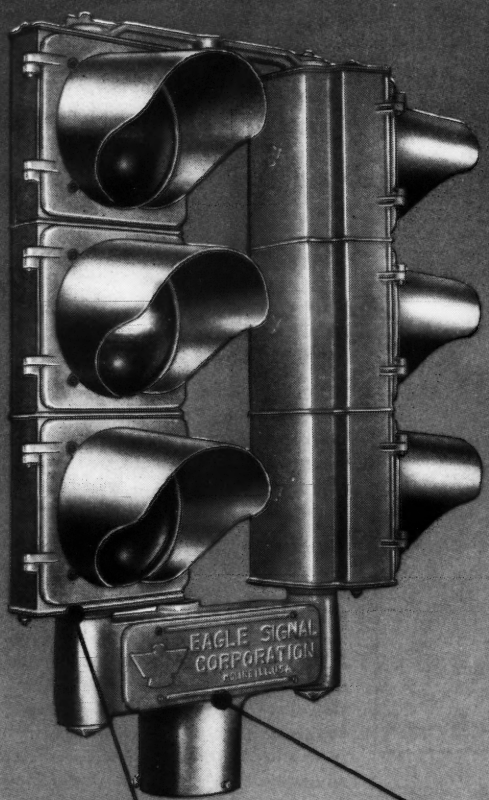
Secretary Hayes read the minutes of the previous meeting, which were approved. No old business. Next meeting will be held in January. **Cecil Simmons** speaking for **Jerry Franklin** of Grand Rapids, pointed out the need for an all-day meeting to discuss problems around the state. An exchange of ideas was suggested and the need for uniformity in traffic control was stressed. These suggestions were taken under advisement.

Carl McMonagle announced the selection of Detroit for the Annual ITE meeting in 1957. He said the automobile industry was very enthusiastic and had promised 100 percent cooperation. He stressed the need for full cooperation of the Michigan Section and urged that preliminary work be started now.

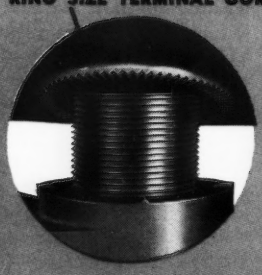
With business out of the way, **President Gervais** introduced **Mr. Lee Cook** of the Electronics Protection Corporation, who presented details of the device they manufacture for emergency vehicles to obtain the right-of-way at signalized intersections. Movies showing the operation of this equipment on emergency vehicles were shown. There was considerable discussion of this device during the question period following the presentation.

Dan Daley introduced **Mr. Phillip J. Dellwo** of the Electronics Division of General Electric Company, who with a capable assistant, presented slides and details about the radio controlled traffic signals to be used in Chicago. He did a very good job of presenting this subject matter and interest generated in this new control method was considerable.

ALLEN T. HAYES
Secretary-Treasurer



EAGLE S23CTCH SENTRY
TWO-WAY TRAFFIC SIGNAL WITH
KING SIZE TERMINAL COMPARTMENT



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Neither wind nor pranksters can turn signal after once locked into position. 72 fine teeth or serrations are integrally cast into top and bottom of signal face that fits snugly into 4 notches on terminal bracket to assure positive locking. Signal can be locked in 5 degree increments to point in any direction.

new

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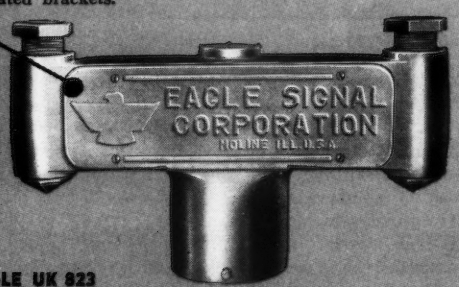
TRAFFIC SIGNAL with new horizontal terminal compartment

Here is a traffic signal of smart, modern appearance that includes many advantageous construction and design features. New offset construction assures greater stability and compactness — yet lighter weight than conventional signals of curved or multi-surface design. The EAGLE SENTRY Traffic Signal can be locked into any position when used with post top terminal compartment bracket (as shown) or with other serrated brackets.



EAGLE UK 823
TWO-WAY TERMINAL COMPARTMENT

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EAGLE

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NAME AND TITLE _____

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FULL ADDRESS _____

MISSOURI VALLEY SECTION

There is still considerable talk about the Pittsburgh Convention. All hands from this Section are singing the praises of those who staged the meeting.

Bill Armstrong and wife **Marietta,** with passengers **Tony Basile** and **Perl Fisher,** drove from Topeka, Kansas, and were quite surprised to see that they could find their way through all the "jungle" between Kansas and The Golden Triangle. **Marietta** reports that the ladies were well pleased with the distaff side of the program.

Dick and **Mrs. Burton,** from Oklahoma City, also braved the wildernesses of Missouri, Illinois, Indiana and Ohio with their covered (but motorized) wagon. What was more startling, however, was their willingness to navigate Pittsburgh's complex street system without benefit of a local guide.

"Doc" A. R. Lauer reports in his "Driving Laboratory News," that Iowa did an excellent job of holding the line on accidents during 1955, showing a decrease in the number of deaths, and an increase in miles traveled. It is indeed good to see that someone is setting a good example during a bad year.

The Missouri State Highway Department's Traffic Control Section moved into new quarters during November. An addition to the old Highway Building has provided less crowded office space and better working conditions. Those visiting the new quarters will have to watch their cigar and cigarette ashes until about the 15th of January, at which time new floors will have become sufficiently old looking to receive the customary treatment.

The Eighth Annual Traffic Engineering Conference is scheduled for May 17 and 18, 1956, at Columbia, Missouri. This conference is sponsored by the University of Missouri, the Missouri Municipal League, and the Missouri Valley Section. This year the State Chamber of Commerce will also participate. Plans are being made for the biggest meeting yet.

LEON W. CORDER
Associate Editor

NEW ENGLAND SECTION

Forty-nine members and guests—we can't seem to break through the half-hundred mark—got together in Hartford, Connecticut, for the December 13 Section Meeting.

O. K. Normann was the guest speaker. He talked on the current work of the HRB Capacity Committee. In the discussion period that followed a great number of questions were asked of **Mr. Normann.** Most concerned the revision that is being made of the Capacity Manual. Others were about how to make proper use of the Capacity Manual. The number and quality of the questions put to **Mr. Normann,** and flawlessly handled by him, are the best evidence of the lively interest his talk created. They should also have indicated to **Mr. Normann** the great amount of use being made of the Capacity Manual in New England.

New Haven's **Bill McGrath** missed the meeting. He's working overtime preparing plans to take advantage of recently enacted legislation authorizing Connecticut cities to establish special truck routes. And, the instant success of his recently opened 300-space downtown parking structure has prompted **Bill** to start plans for a second development.

Parking is a pretty hot subject in Providence too. There, General Obligation Bonds for 1.8 million have been authorized to finance a downtown facility. **Roger Chandler** and **Ed Colby** haven't the money yet though. There's the matter of a court date in January that must be taken care of first. It's then that the constitutionality of the city furnishing parking will be examined. The issue is being raised by people who now own property that will be needed for the parking development.

Continuous surveillance of the operations on high type roadways is a coming thing. Determination of the best method of achieving it is the only problem. So, **Dan Hammond** and Bruce Campbell Associates up Boston way, are involved in a study looking into the possibilities of television a la the recent Detroit experiment. It should be an educational project. And, it will be interesting to see how their findings check with Detroit's.

Phil Mancini, popular Traffic Engineer for Rhode Island, is preparing plans to modernize the signals on Elmwood Avenue in Warwick. The new system is being designed around the latest in traffic-actuated master control equipment.

Submitted by
EDWARD G. MOGREN

NEW YORK METROPOLITAN SECTION

The New York Metropolitan Section met on November 16 at 1:00 P.M. with the meeting being called to order by **President Herbert J. Klar.**

The speaker was **Mr. Joseph C. Ingraham,** reported from the New York Times, and author. The subject of his address was, "Let's Face Some Unpleasant Facts." **Mr. Ingraham somewhat** startled the membership by stating that engineering has become a minor phase of the traffic problem. He pointed out that the Engineer in charge of a Traffic Engineering Department is more properly termed a Traffic Commissioner and that such a person receives all sorts of complaints regarding traffic problems whether or not they are related to engineering. **Mr Ingraham** suggested that to improve traffic conditions in the cities, the Traffic Commissioner must get away from engineering. Problems cannot be solved by engineering alone, and that the engineer is paying too much attention to little things and not enough to the big ones. The Traffic Commissioner's job involves besides engineering, salesmanship, politics, labor relations and diplomacy.

In the discussion which followed his talk, **Mr. Ingraham** pointed out that he did not mean to imply that there should be no traffic engineers. A large city department certainly needs qualified engineering specialists. But he emphasized that the person in charge of such an organization should have a broader scope than engineering alone. **Mr. Ingraham** also pointed out that few traffic engineers have the ability to properly express themselves. He suggested that wider press coverage be afforded traffic engineering meetings and discussions, and that the press be invited to not only hear the discussion but to take part in it in order that they may find out the answers to the questions which their readers want.

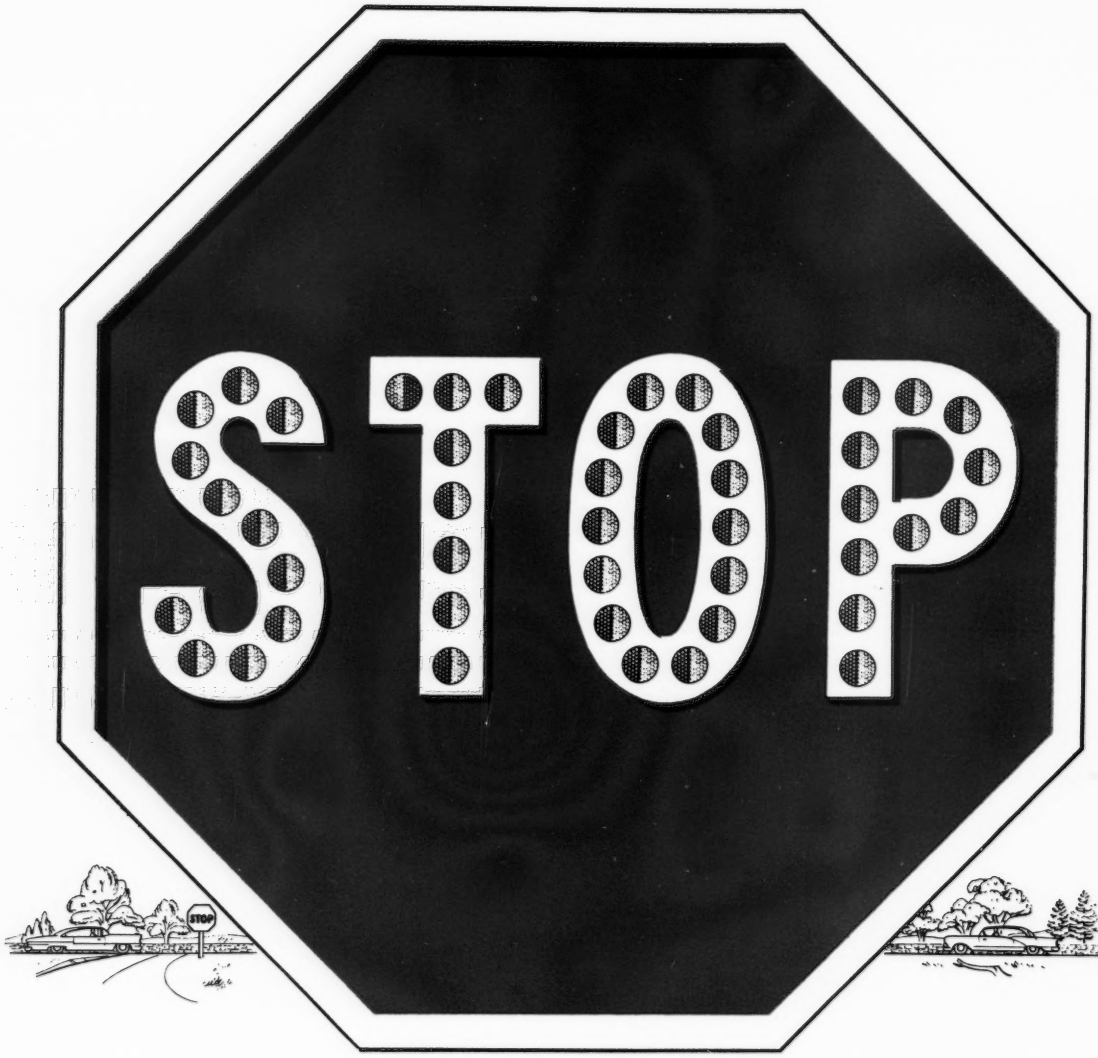
H. JACK LEONARD
Secretary-Treasurer

SOUTHERN SECTION

Taken from Southern Section Newsletter, **A. M. White,** editor.

Ken Wilkinson reports the Richmond Bureau of Traffic Engineering began November 14, 1955, the installation of numerous traffic regulatory signs to institute one-way streets and numerous no parking regulations which will affect over 100 linear blocks. A major innovation was a joint study by the local Bureau of Traffic Engineering, Transit Company and merchants to determine the need and justification for no parking 6 P.M. to 9:30 P.M. on many downtown thoroughfares while stores are open evenings. After the studies were conducted all agreed on the need for the regulations; also that the $69,000,000 toll road from Richmond to Petersburg is now a reality since the first boring contracts were authorized recently.

The City of Burlington, North Carolina, has ordered the material to install pedestrian "Walk — Don't Walk" signals at two intersections in the central business district. These two intersections with pedestrian control will be a "first" for the City of Burlington. The pedestrian signals will be the newly designed red "Don't Walk" — green "Walk". Burlington will not provide an exclusive or scrambled system for pedestian walk, but will use a semi-exclusive



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arrangement which will permit the movement of pedestrian traffic with vehicles but removing the conflict between pedestrians and turning vehicular traffic. The system was designed and is being installed under the supervision of **Bernard A. Corbett, Jr.**, Traffic Engineer, City of Burlington.

During the past several months, the use of an illuminated speed limit sign in school zones has been more widely accepted. The City of Greensboro, North Carolina, uses an alternate flashing amber signal encased with a speed limit sign reading "25 MPH WHEN FLASHING". The alternate flasher is controlled by a time switch which sets the sign into operation during those periods only when children are going to and from school and during recess. Greensboro has reported through its Traffic Engineer, **Robert Kimberly**, excellent results in the reduction of speed in school zones and wide acceptance by motorists and citizens. In Virginia, the first city to install this type sign was Alexandria. **Kenneth Smith** has installed the sign at approximately six schools throughout the city and has plans for the expansion of the program. **Ken** reports that through the proper use of illuminated school speed limit signs, speeds are reduced to the posted limit during those hours when the sign is in use.

Virginia Highway Department has secured another District Traffic Engineer, **Mr. Karl Noerr**, a graduate of VMI and the Yale Bureau. **Karl** is now District Traffic Engineer at Culpeper, replacing **J. L. Thomas** who was transferred to the Staunton District. The Department has installed an electronic scale on US 1 for northbound traffic approaching the static scale at Woodbridge, Virginia. It is the purpose of the electronic dynamic scale to screen vehicles approaching the static scale in order that vehicles not in excess of the legal limits may proceed without crossing the static scale as is now required. The dynamic scale is not in operation yet, but is expected to be in operation within the near future following the completion of signs and signals. The sign designed to accomplish the screening is an internally illuminated sign having an overall dimension of 6′ x 12′. The message on the sign reads as follows: first line, "TRUCKS ONLY", to burn continuously in amber; second line, "DO NOT", to burn as required in green; third line, "ENTER", to burn as required in red or green; and fourth line, "WEIGH STATION", to burn as required in red or green. When an overweight vehicle crosses the scale, the sign will read "TRUCKS ONLY" in amber, "ENTER WEIGH STATION" in red with right arrow in red. When a truck crosses the scale not in excess of the legal limit, the sign will read "TRUCKS ONLY" in amber, "DO NOT ENTER WEIGH STATION" in green with vertical arrow in green. Provisions have been made to illuminate the message for two seconds. In the event, however, the green message is burning, it will be pre-empted by a red message.

March 4, 5, and 6 are the dates set for the Southern Safety Conference and Southern Section ITE to be held at the Biltmore Hotel in Atlanta. Details of the conference can be obtained by writing: Southern Safety Conference, Inc., Box 8297, Richmond 25, Virginia. A traffic engineering session is to be included in the program and an agenda for the Southern Section.

WESTERN SECTION

Intermountain Area

Congratulations to **Bob O'Connell** on the arrival of a third girl in the family, born October 12th. Her name is Shelly and although she was supposed to be a boy to qualify for ITE membership and Assistant to the Traffic Engineer, she still rates top billing in the O'Connell household.

Bob O'Connell reveals that **Woody Rankin** is under the impression that Wyoming uses "Sheep - actuated" traffic signals at all rural intersections. Speaking of livestock, the striping crew of the Wyoming Highway Department was recently requested to leave 200-foot gaps at three locations along an old section of highway so that cattle could be induced to cross the roadway at those places. According to the Wyoming report, cattle shy away from the painted centerline, which is more than may be said for many drivers. The Wyoming Highway Department has found painted cattle-guards, placed transversely across the highway, quite successful in one part of the state.

The Colorado Department of Highways had to prevail upon the Denver Traffic Engineering Section to install a traffic signal so that highway personnel could gain access from a busy city thoroughfare to the new headquarters building of the Department. Fancy that now!

Al Pepper was awarded his 20-year pin for one full score years of service with the Colorado Department of Highways.

San Diego Area

Skinny DeYoung's and **Red Matthews'** recent visit to San Diego brought forth **Marty Bouman, Paul Fowler, Steve George, Ed Hall, Lucky Luckenbach, Jim Reading and Mel West** for an area

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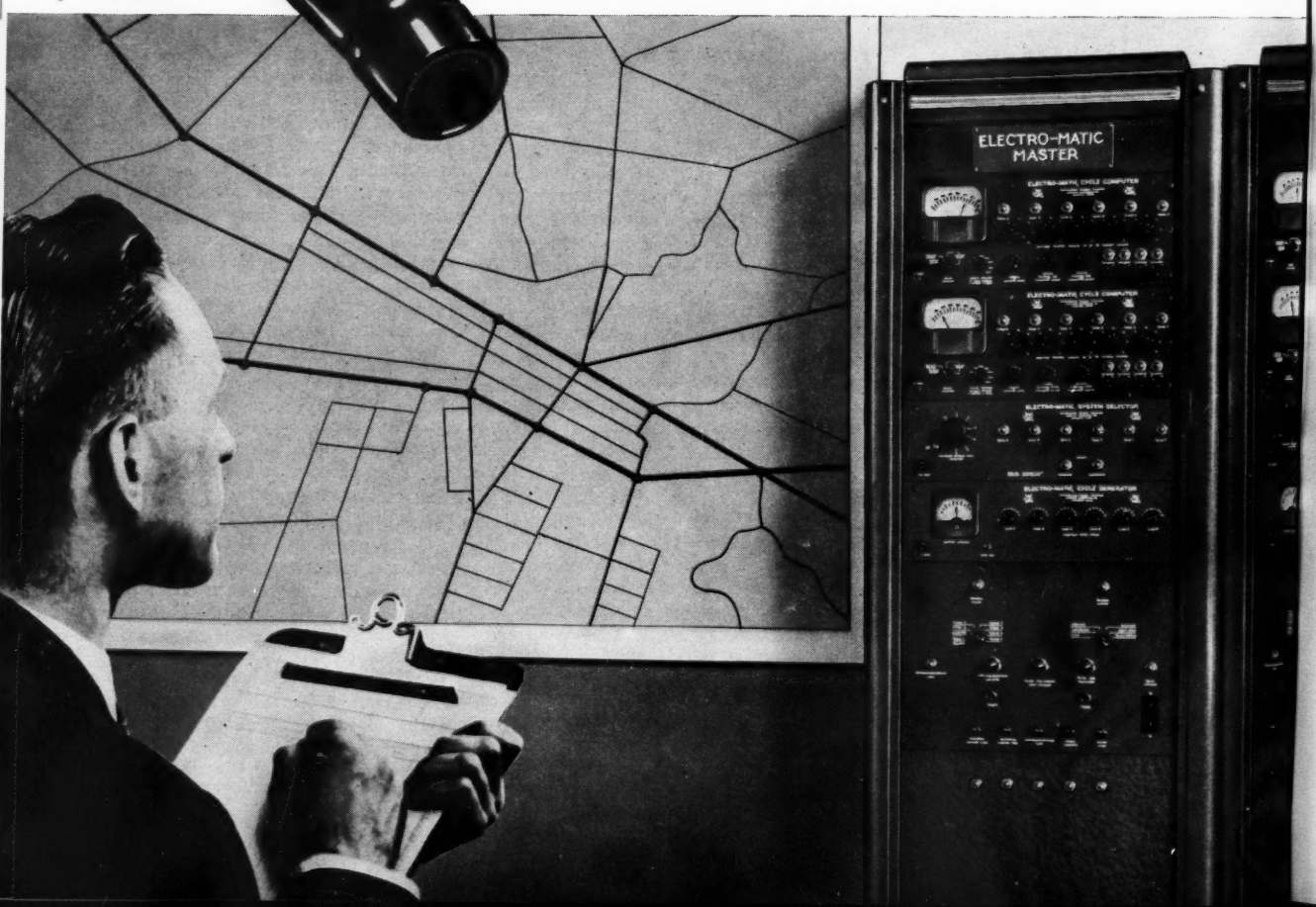

luncheon meeting. **Marty Bouman**, the new area chairman, invited the San Diego Section to his home for a formal inspection of his recently completed patio. This party also served to welcome **John Tsiknas** as a new member of the ITE. All the wives were allowed to sit out on the patio while the gentlemen remained inside the warm house.

Jim Reading reported on his recent combination business and monkey-business trip through the East coast and to the annual meeting in Pittsburgh. **Ed Hall** filled in on the technical sessions that took place after 5 P.M.

The City of San Diego Traffic Engineering Division reports a recent serious problem as a result of the installation of a chrome plated fire plug in La Jolla and the resultant glare problems. This chrome-plated fire plug has also caused serious canine congestion.

Arizona-New Mexico Area

Arizona—A conference was held in Tucson at the request of Professor **David Hall**, University of Arizona. In attendance were **John Caarls**, Tucson Traffic Engineer, **Bill Price**, Arizona State Highway Traffic Engineer, and **Chuck Haley**, Phoenix Traffic Engineer. The Civil Engineering Department of the University is interested in conducting a research project in the field of traffic engineering and the meeting was held for the purpose of determining a suitable research project.

In Phoenix extensive resurfacing is under way encompassing some ten miles of major arterials including the downtown area. Inasmuch as this work is being done simultaneously on all streets the Phoenix Traffic Engineering Division will have a terrific problem of restriping the arterials when the resurfacing program is completed.

Deer season and elk season are approaching and **Chuck Haley** is planning on getting a deer and an elk.

Oregon Area

The Oregon area held its first meeting of the year October 21, 1955, at the Frontier Room in Vancouver, Washington. A fine dinner and social hour were enjoyed by 31 members and guests. The Washington area was represented by **Rex Still** and **Don Hanson**. Visiting was **VIP Skinny DeYoung**. **Jim Gallagher** assisted **Howard Huget** with the arrangements. **Charles Seavey** of the Pacific Telephone and Telegraph amazed and entertained the group with a discussion of the abilities and uses of the transistor. The group decided to contact **Martin Coopey** to see if arrangements can be made to hold the Northwest Traffic Engineering Conference at Oregon State College during the second week of May. A committee to arrange a "ladies' night" meeting was announced. The chairman will be **Dennis Peterson**, who will be assisted by **Bud George**, **Harry Esch** and **Glen Clark**.

Al Head, **Dave Schoppert** and **Ted Dec** met with members of the Corvallis business district. Present plans call for the city to conduct the study with the assistance of the Oregon State College, ably represented by **Martin Coopey**, who will assign the work to students in the Civil Engineering Department. The Oregon Highway Department will assist in certain technical phases but will not actively participate in the field work.

Washington Area

Bob Dunn reports acquisition of a new Buick. Like **Joe Havenner**, Bob says: "The Buick is almost too wide for the garage, but I can't fix the garage because it is in the basement of the house, and after buying the Buick I can't afford a new house. So I just close my eyes when I drive through the door."

Bay Area

Jerry O'Shea is in the Stanford University Hospital recuperating from an operation, same being to remove certain instruments and tools left in him from a previous operation. It has been reported that they found scissors, clamps, a claw hammer and a crescent wrench. All were well preserved probably due to the preservative quality of imbibed fluids. **Jerry** is progressing rapidly and will presently be back at his desk.

Twenty-seven students are taking graduate work at the ITTE, University of California, of whom 15 are full-time graduate students in transportation. Eight states and four foreign countries are represented in the group. Those working on thesis projects pertaining to traffic are **P. S. Brown**, Olympia, Washington, **A. A. Johnson**, Boise, Idaho, **T. T. McLeod**, Vancouver, Washington, **J. C. Ray**, St. Paul, Minn., **P. W. Shuldiner**, Columbus, Ohio, **B. N. Crowell**, Palo Alto, California, **D. J. Faustman**, Sacramento, California, **Mark Kermit**, San Francisco, **J. H. Kell**, Berkeley, **A. E. Simmons**, and **E. C. Tedesco**, Division of Highways, San Francisco. **Jack Faustman**, **Al Simmons**, **Jim Kell** and **P. W. Shuldiner** are working for their doctorate.

Research projects underway by these graduate students are: Analysis of of Traffic Gaps by IBM techniques, Study of Right Turns on Red Signal, Effectiveness of Yield ROW Signs replacing Stop Signs, Determination of 30th Highest Hour from Traffic Volume Data, Characteristics of Mass Transit Routes, Economic Feasibility of Off-Street Parking and Procedure for Obtaining Uniform Surface Brightness for Street Lighting Design.

Reported by
BOB DUNN
Associate Editor

Sacramento Area

Baynard (Barney) Switzer, who formerly headed the sign design and location section in the traffic engineer's office, Division of Highway Headquarters in Sacramento, has been transferred to the Safety Section where he will succeed **Irv Rivett** as Safety Engineer.

For the moment at least, **Bruno Dentino** is serving as **Switzer's** successor in the sign design and location section. **Karl Moskowitz** has been promoted from Senior to Supervising Engineer and is in charge of the Geometric Standards and Traffic Service Section of the Traffic Engineer's office headquarters, Division of Highways, in Sacramento.

One hundred sixty-four attended the joint I.T.E. Governor's Traffic Safety Conference dinner on Thursday night, October 6, 1955, at the University Club.

Gran Parmelee was elected as Chairman of the Steering Committee of the Engineering Division for the next year.

Wyoming

Bob O'Connell announces that he is once again without "the assistance of an assistant" and invites all discontented traffic engineers to submit applications to the Cheyenne office. Bob has been busy this summer trying to streamline Wyoming's speed zoning program and only recently returned from the WASHO convention in Jackson, Wyoming.

Colorado

Gerry Rothweiler attended a convention of the I.M.S.A. in Rochester, N.Y. Next year, the national meeting of the Association will be held in Denver.

Jack Bruce and **Al Pepper** played host to a **Dr. Faruk A. Umar**, Professor of Highways and Traffic Engineering at Technical University, Istanbul, Turkey, visiting in this country to learn something of traffic engineering practice and organization.

A new parking ban on Denver's downtown numbered streets has been imposed to ease traffic movements during the morning and evening rush hours and clear the streets for cleaning and snow removal operations.

Yearbook Changes

ALLEN, Robert J. (Associate)
Assistant Manager, Accident Prevention Department, Association of Casualty & Surety Cos., 60 John Street, New York 38, New York.

ANDRIACCHI, Louis A. (Associate)
Market Manager, Minnesota Mining & Mfg. Co., 900 Fauquier Avenue, St. Paul 6, Minnesota.

BERRY, Donald S. (Member)
Professor of Transportation Engineering, School of Civil Engineering, Purdue University, Lafayette, Indiana.

BOOTH, James W., Jr. (Associate)
Assistant Traffic Director, Department of Traffic Engineering, Baltimore. SEND MAIL: 225 Altamont Avenue, Catonsville 28, Maryland.

BROWN, Richard E. (Junior)
Junior Traffic Engineer, Traffic Engineering Division, 417 Lincoln Park Drive, Cincinnati, Ohio.

CAMPEAU, Charles E. (Member)
Director, City Planning Department, City Hall, Room 403, Montreal, P. Q., Canada.

COLEMAN, Robert R. (Associate)
Traffic Engineer, Pennsylvania Department of Highways. SEND MAIL: 4605 North Road, Harrisburg, Pennsylvania.

CORBETT, Bernard A., Jr. (Junior)
Assistant Traffic Engineer, City Hall, 600 East Trade Street, Charlotte, North Carolina.

CORGILL, William E. ((Junior)
Director, Traffic Engineering Section, Accident Prevention Department, Association of Casualty & Surety Cos., New York 38, New York. SEND MAIL: 77 Locust Avenue, Staten Island 6, New York.

DEETZ, Russell S. (Member)
Project Manager, Ohio Turnpike Commission, 8080 Prospect Road, Berea, Ohio.

DRAKE, Gerard L. (Junior)
Associate Engineer, Wilbur Smith & Associates, New Haven. SEND MAIL: 25 Pineview Drive, Foxon, East Haven, Conn.

FLYNN, Earl H. (Associate)
Traffic Engineer, M. A. Kaehrle, Consulting Engineer. West Hartford. SEND MAIL: 147 Goodale Drive, Newington 11, Connecticut.

FOWLER, Fred T. (Member)
City Traffic Engineer, Bureau of Traffic Engineering, 526 S.W. Mill Street, Portland 1, Oregon.

FRANKLIN, Jerome D. (Member)
City Traffic Engineer. SEND MAIL: 25 Burr Oak St. N.E., Grand Rapids, Michigan.

GOVE, A. Wallace (Associate)
Traffic Engineer, Bureau of Traffic Engineering, 20 East Worcester Street, Worcester 8, Massachusetts.

GUNDERSON, Oscar M. (Member)
Planning Engineer, Board of Wayne County Road Commissioners, 7th Fl., City-County Bldg., Detroit 26, Michigan.

HIGGINS, Herbert C. (Member)
Engineer of Toll Bridges, Toll Roads & Ferries, Department of Highways. SEND MAIL: Route 6, Box 142, Olympia, Washington.

HILL, F. Norman (Affiliate)
Executive Vice-Pres. & Gen. Mgr., Red Arrow Freight Lines, Inc., 1415 Conti Street, Houston 14, Texas.

HOFFMAN, Paul G. ((Honorary)
Chairman of Board, Studebaker-Packard Corp., 4530 Loma Vista Avenue, Los Angeles 58, California.

HUBBARD, Robert A. (Junior)
Highway Engineer Trainee, Virginia Dept. of Highways, Richmond. SEND MAIL: 501 Beech Street, Farmville, Virginia.

McDONALD, John W. (Associate)
Assistant Dist. Traffic Engineer, California Division of Highways, San Luis Obispo. SEND MAIL: 3715 Riviera Drive, San Diego 9, California.

NADON, Joseph D., Jr. (Junior)
City Traffic Engineer, 212 N. Kansas Street, El Paso, Texas.

QUINN, Jay W., Jr. (Associate)
Traffic Engineer, Traffic Engineering Department, Hickory, North Carolina.

RANKIN, Woodrow W. (Associate)
Dept. Traffic Engineering Services, Room 113, City Hall, Ottawa, Ontario, Canada.

REEN, Calvin G. (Associate)
Professor of Civil Engineering, Pennsylvania State University. SEND MAIL: 806 West Beaver Avenue, University Park, Pennsylvania.

REX, Charles H. (Member)
Advance Development Engineer, Outdoor Lighting Department, General Electric Company, Hendersonville, North Carolina.

RICE, Paul W. (Associate)
Director of Traffic Engineering, Corpus Christi, Texas.

SMITH, Wilbur S. (Member)
Wilbur Smith & Associates, 265 Church Street, New Haven, Connecticut.

SWACKHAMER, Robert J. (Affiliate)
Manager, Street Lighting Sales, General Electric Company, Hendersonville, North Carolina.

Membership Applications

The following applications have been received since the list of applicants published last month.

APPLICATIONS FOR TRANSFER

AVERY, Eugene V.
City Traffic Engineer
274 City Hall
St. Paul Minnesota
December 19, 1955 for ASSOCIATE grade

GIBSON, Arthur C.
Sign Shop Supervisor
City of Detroit
1601 Modern Avenue
Detroit, Michigan
January 9, 1956 for MEMBER grade

KAISER, Fred J., Jr.
City Traffic Engineer
208 City Hall
Racine, Wisconsin
January 12, 1956 for ASSOCIATE grade

OSBORN, Howard W.
Planning & Operations Engineer
Maintenance Division
Panama Canal Company
Box Q
Balboa Heights, Canal Zone
December 20, 1955 for ASSOCIATE grade

NEW APPLICATIONS

BLAKELY, William J.
Planning Engineer
Corporation of the District of Burnaby
Municipal Hall
1930 Kingsway
South Burnaby, British Columbia
December 20, 1955 for ASSOCIATE grade

CHESTER, Robert C.
Traffic Engineer
City Hall
Lubbock, Texas
January 5, 1956 for JUNIOR grade

CROWELL, Donald R.
Traffic Engineer II
Bure au of Street Traffic & Parking
Room 709, City Hall
Chicago 1, Illinois
January 12, 1956 for JUNIOR grade

GARVER, Mark G.
Partner, Garver & Garver, Engineers
325-326 Exchange Building
Little Rock, Arkansas
December 15, 1955 for ASSOCIATE grade

KOLTNOW, Peter G.
Graduate Student and Senior Engineering Aide
University of California
Berkeley 4, California
December 16, 1955 for JUNIOR grade

LARSON, Robert A.
Highway Planning Engineer
Oakland County Planning Commission
1 Lafayette Street
Pontiac, Michigan
January 5, 1956 for JUNIOR grade

MILLER, Charles D.
Engineer of Traffic and Planning
State Highway Dept. of Indiana
State House Annex
Indianapolis, Indiana
January 6, 1956, for MEMBER grade

SANSOM, Frederick J.
Traffic Engineer, Grade 2
Municipality of Metropolitan Toronto
Traffic Engineering Dept.
153 St. Clair Avenue, W.
Toronto, Ontario, Canada
December 15, 1955 for ASSOCIATE grade

WHISTON, Edward G.
Highway Engineer
Cook County Highway Department
130 N. Wells Street
Chicago, Illinois
December 12, 1955 for MEMBER grade

WYATT, Francis D.
Consulting and Electrical Engineer
1435 Catalpa Avenue
Chicago 40, Illinois
December 15, 1955 for MEMBER grade

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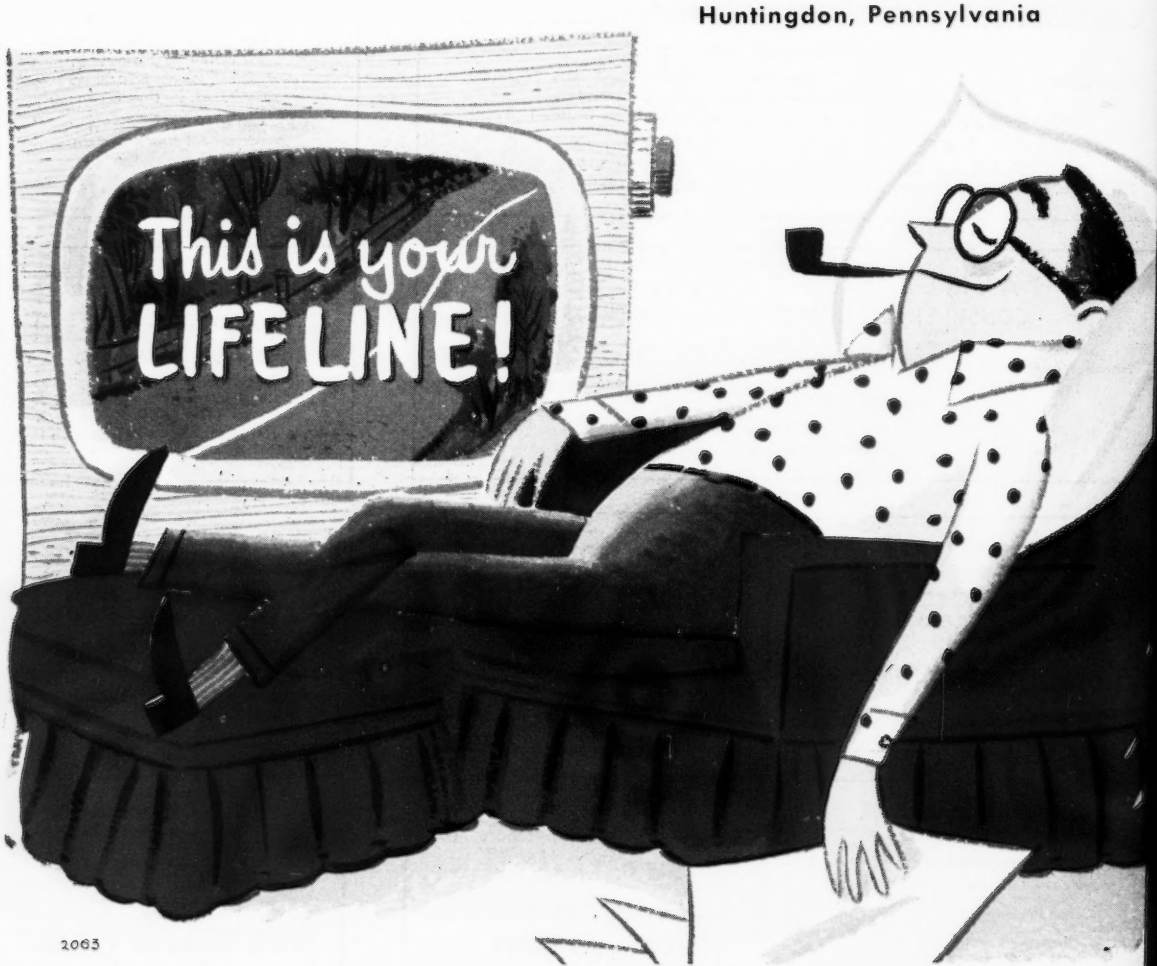

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